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Specification and Drawings, as originally filed, with Application for Patent Serial No:
2,437,179, on August 13, 2003, by PANOS YIOTIS PATRIKAKIS, for "Vehicle Mirror
System".

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ABSTRACT OF THE DISCLOSURE

A mirror system for a vehicle comprising a combination driver's side view mirror and blind spot mirror said combination driver's side view mirror and blind spot mirror located in a housing mounted on the vehicle so there having a first section of the mirror housing in the interior of the vehicle and a second portion of the mirror housing on the outside of the vehicle; and means are provided whereby a driver can see the rear view along the side of the vehicle and view the blind spot.

TITLE: VEHICLE MIRROR SYSTEM

FIELD OF THE INVENTION

5 The present invention relates to a vehicle (car, truck, van, etc) mirror system. In particular this present invention provides a mirror design that has the capability to permit a driver to clearly see and check the angle of view referred to as the blind spot on the sides of the automobile.

10

BACKGROUND OF THE INVENTION

There are many designs of mirrors that are used by all sorts of automobiles. Generally due to the manner that mirrors are 15 designed and installed on automobiles the driver does not have a comprehensive view on either side of the vehicle.

Present mirrors on automobiles, do not provide total coverage of the viewing area on both sides of the automobile. The driver of a vehicle usually has a rear view 20 mirror and conventional left and right side view mirrors on each side of the vehicle. There is a blind spot created for the driver when both his rear view mirror and side view mirror are properly and conventionally adjusted. This "blind spot" prevents the driver from viewing a predetermined area 25 behind his vehicle by the use of the rear view and side view mirrors. A driver checking the view from both the rear view and side view mirrors cannot see a vehicle, which is in an adjacent lane, in a "blind area" along side his vehicle.

30 Typically, the rear view mirror provides a viewing angle of about thirty degrees. This angle may, of course, vary somewhat, but thirty degrees is typical and any variations will not be greater than about plus or minus five degrees. The rear view mirror gives a partial view of the adjoining 35 lanes of traffic when it is correctly adjusted so that if a car in an adjacent lane is far enough behind, the driver will see the car in his rear view mirror.

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The driver's side view mirror is normally tilted at an angle of about twenty degrees (plus or minus one or two degrees) to a line drawn at right angles to the longitudinal axis of the car, depending upon the position of the driver, the

- 5 distance between his eyes, his height and position in the seat.

A driver to help him see towards the rear and along the side of his car, to cover the view of the adjacent lane, tilts

- 10 the driver's side view mirror. In positioning the driver's side view mirror, the driver must maintain some rearward part of his vehicle in view in order to have some base or reference point to judge how far other cars are from him to the rear.

15

Therefore, with respect to the driver's side view mirror the field of view is determined by the angle of the mirror and a driver cannot see anything to the left of a line of sight of the driver's side view mirror.

20

A similar problem occurs with the passenger's side view mirror creating a blind spot on the right side of the line of sight defined by the right side mirror.

25

For the right side blind spot a driver has to turn his head to his right to an angle of around 120 degrees in order to check the blind spot. For the left side blind spot a driver has to turn his head to at least 90 degrees in order to check the blind spot.

30

Various solutions have been attempted to minimize the blind spot and avoid the driver having to turn his head to check the blind spot. For example, there are small convex mirrors that are attached on the regular automobile mirrors that

- 35 show the blind spots but with a serious shortcoming. On these convex mirrors an object that one sees is closer than it appears. This fact alone makes these mirrors dangerous in

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the sense that if a driver miscalculates when he/she changes lanes, she/he may cause an accident.

There is a need for a device that overcomes the problem just

- 5 described and shows objects at real distances. In other words objects are shown realistically, and are as far or as close as they appear.

United States Patent 5,245,479 relates to an automotive,

- 10 side, rear view mirror accessory in the form of a prism configured to be adhesively attached to the standard automotive, side, rear view mirror, providing the user through refracted light with a wider scope of vision with regard to the reflected image in the rear view mirror.

- 15 The prism's positioning, size, and angle of refraction can be configured in varying degrees in order to provide the user with maximum efficient viewing of any "blind spot" which might exist at any particular angle with regard to the normal angle of view. The prism unit may be adhesively

- 20 mounted to a standard automotive side rear view mirror utilizing "off-the-shelf," transparent cement, or, alternately, the unit may be a one-piece construction wherein the prism and mirror are molded as one, or the prism itself may have a backing of reflective material, thereby

- 25 dispensing with the necessity of transparent cement. The prism is located at the outer edge, namely, on the outer, left edge for the driver's side, rear view mirror and on the outer, right edge of the side, rear view mirror on the passenger's side. The prism mirror in this reference is

- 30 adhesively attached at the end of the conventional mirror which means it cannot be adjusted independently to accommodate the sitting position of the driver. In addition based on the drawings, the viewing angle would be impeded by the edge of the outer shell of the conventional mirror.

- 35 United States Patent 5,594,594 describes a triangular prism mirror mounted adjacent a driver of a vehicle to enable the

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driver to view the blind spot area without any distortion of vision. The triangular prism mirror unit has three plane surfaces, the rear surface being blocked. By blocking the rear surface of the prism, the image entering one of the front surfaces will appear on the other front surface.

Therefore the triangular prism mirror, when properly mounted, provides a clear vision for the driver of a vehicle giving access to the blind spot area. Using this design, when viewing the prism mirror the driver in his peripheral vision sees other objects/items around the prism mirror and this can be confusing if one is to consider that this process is supposed to happen in split second timing. By having the prism mirror situated above the conventional one it looks awkward and bulky and not at all eye-pleasing and definitely looks like a foreign body. The blind spot mirror obstructs part of the view of the driver which is just above the conventional mirror and that means the driver cannot check far ahead distances.

U.S. Patent Re. 30,673 discloses a composite mirror assembly adapted to be mounted adjacent the driver of a vehicle to enable the driver to view objects, as other vehicles, within an area normally hidden from view by conventional vehicle mirrors. An additional mirror is positioned at an angle with respect to the conventional side mirror. The angle selected is between six to ten degrees with respect to the surface of the side mirror. In this manner, the additional mirror as positioned enables the driver of the vehicle to view objects within said area, which objects would normally be hidden from view by conventional and existing apparatus. Fig 2 of this patent shows a prism attached on the conventional mirror. The two adjacent sides of the mirror prism are unequal. The incident angle (what the eye is looking at) is much smaller than the viewing angle. This does not help the driver because what and how much area of the blind spot the driver sees has to be equal of the viewing area of the blind spot if items are to remain undistorted. In addition, the

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prism mirror is attached (affixed) to the conventional mirror, that means that if the conventional mirror is not set properly you can't really see clearly the blind spot. This mirror prism is not independently adjusted to
5 accommodate the driver.

Further more because of the way the blind spot mirror is placed on the conventional mirror, it is not protected from surrounding shadows, reflections and of the elements (rain, snow) at all times. In other words there are elements that do not inspire confidence of seeing clearly the blind spot
10 at all times.

Other more sophisticated methods of eliminating the blind
15 spot have been proposed with the use of radar and cameras.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a mirror
20 system that can show a driver the blind spots on the sides of the automobile .

A further object of the present invention is to provide a mirror system that will permit a driver to view the side and rear of the vehicle including the blind spot without the
25 need for a driver to turn his head to check the blind spot.

Another object of the present invention is to provide a mirror system that shows objects as they appear at real
30 distances.

Accordingly in one embodiment of the mirror system of the present invention, the driver's side mirror is located in a mirror housing mounted on the vehicle so there is a first
35 section of the mirror housing in the interior of the vehicle and a second portion of the mirror housing on the outside of

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the vehicle. The first section of the mirror housing has a generally rectangular rearwardly open box configuration with a first end adapted for attachment to the vehicle, a second remote end and top, bottom and front walls. One or more 5 prisms, preferably a single right angle prism, are mounted in the opening of the first section of the mirror housing. The prisms have a first viewing side, a second side connected to one side of the first viewing side, preferably perpendicular to the first viewing side and a third side 10 connecting the remote ends of first and second sides (i.e. the hypotenuse where the prism is a right angle prism). The prisms may be mounted in a manner to permit adjustment of the prisms to accommodate drivers of different sizes, however the prisms may be fixed. The second section of the 15 mirror housing has a generally rectangular rearwardly open box having one end adapted for attachment to the first end of the first section of the mirror housing, another or remote end and top, bottom and front walls. One or more reflective or refractive means are mounted in the rear of 20 the opening of the second section of the mirror housing at an angle to the second side of the prism(s) in the first section of the mirror housing so that when the driver looks through the first viewing side of the prism he can see either or both along the side of the vehicle and the blind 25 spot area along the side of the vehicle. The mirror system is further preferably adapted equipped to protect it from damage and weather conditions.

In another embodiment of the mirror system of the present 30 invention, a combination driver's side view mirror and blind spot mirror is provided. The combination driver's side view mirror and blind spot mirror is located in a housing mounted on the vehicle so there is a first section of the mirror housing in the interior of the vehicle and a second portion 35 of the mirror housing on the outside of the vehicle. The first section of the mirror housing has a generally rectangular rearwardly open box configuration with a first

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end adapted for attachment to the vehicle, a second remote end and top, bottom and front walls. At least one prism, preferably a right angle prism, is mounted in the opening of the first section of the mirror housing. The prism has a 5 first viewing side, a second adjacent side, preferably perpendicular to the first viewing side and a third side connecting the remote ends of the first and second sides (i.e. the hypotenuse in the case of a right angle prism). The prism may be mounted in a manner to permit adjustment of 10 the prism to accommodate drivers of different sizes or may be fixed. Where one prism is used, one part of the prism is used to see the rear view along the side of the vehicle (the rear view portion) and another part of the prism is used to view the blind spot (the blind spot portion). Alternatively 15 if two separate prisms are used one prism is used, one prism is used to see the rear view along the side of the vehicle (the rear view prism) and another prism is used to view the blind spot (the blind spot prism). The second section of the mirror housing has a generally rectangular rearwardly open 20 box having one end adapted for attachment to the first end of the first section of the mirror housing, another or remote end and top, bottom and front walls. A first reflective or refractive means, preferably a flat mirror, is mounted in the rear of the opening of the second section of 25 the mirror housing adjacent the remote end of the second side of the blind spot portion of the prism where one prism is used. The flat mirror is mounted in a manner to permit the driver to look through the first viewing side of the blind spot portion of the prism and see the blind spot area 30 along the side of the vehicle. A second reflective or refractive means, preferably a second flat mirror, is mounted in the opening of the second section of the mirror housing. The second flat mirror is mounted in a manner to permit the driver to look through the first viewing side of 35 the rear view portion of the prism to thereby permit the driver to see along the side of the vehicle. The mirror

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system is further equipped with means to protect it from damage and weather conditions.

- In another embodiment of the mirror system of the present
- 5 invention there is provided a blind spot mirror for use with a typical vehicle side view mirror mounted in a mirror housing adapted to be attached to the side of a vehicle. The mirror housing typically has a generally rectangular rearwardly open box configuration with a first end adapted
- 10 for attachment to the vehicle, a remote end and top, bottom and front walls. The vehicle side view mirror is mounted in the rear opening of the mirror housing. The blind spot mirror of the present invention comprises a right angle prism mounted adjacent the remote end of the mirror housing
- 15 in a manner to permit adjustment of the prism to accommodate drivers of different sizes. The right angle prism is further equipped with means to protect it from damage and weather conditions.
- 20 One embodiment of the means to protect the prism from damage and weather conditions, comprises mounting the prism in a manner that it can be rotated from an open to a closed position. Alternatively a transparent cover can be placed over the opening in said housing through which the prism and
- 25 side view mirror can be seen.

BRIEF DESCRIPTION OF THE DRAWINGS

- Preferred embodiments of the invention are shown in the
- 30 drawings, wherein:

- Figure 1 is a schematic representation illustrating the blind spots using conventional vehicle side mirrors.
- 35 Figure 2 is a schematic representation illustrating how light is refracted through a right angle prism.

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Figure 3 is a perspective view of one embodiment of an automobile equipped with one embodiment of the mirror system installed on the door frames according to the present invention.

5

Figure 4 is a rear plan view of the automobile of Figure 3.

Figure 5 is a top plan view of the automobile of Figure 4.

10 Figure 6 is a perspective view of one embodiment of a left side mirror of the mirror system of Figure 3 according to the present invention.

15 Figure 7 is another perspective view of the left side mirror of Figure 6 with the left side exposed.

Figure 8 is a top view in partial cross section of the left side mirror of Figure 7.

20 Figure 9 is a cross-section view along lines 9-9 of the left side mirror of Figure 8.

25 Figure 10 is a perspective view of another embodiment of a left side mirror for the mirror system of Figure 3 according to the present invention.

Figure 11 is a top view in partial cross section of the left side mirror of Figure 10.

30 Figure 12 is a cross-section view along lines 12-12 of the left side mirror of Figure 11.

35 Figure 13 is a schematic representation of how light is reflected by a flat mirror and refracted through a right angle prism;

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Figure 14 is perspective view of one embodiment of a right side mirror for use with the mirror system of Figure 3 according to the present invention;

5 Figure 15 is top view in partial cross section of the right side mirror of Figure 13;

Figure 16 is a cross-section view along lines 16-16 of the right side mirror of Figure 15.

10 Figure 17 is perspective view of an embodiment of a blind spot mirror according to the present invention;

15 Figure 18 is a view in partial cross section of the blind spot mirror of Figure 17.

Figure 19 is a perspective view of another embodiment of an automobile side mirror equipped with a retractable blind spot mirror of the present invention.

20 Figure 20 is a perspective view of the automobile mirror of Figure 19 with the blind spot mirror of the present invention retracted.

25 Figure 21 is a top plan view in cross section of the automobile mirror of Figure 19.

Figure 22 is a perspective view of a plate to hold the prism for the retractable blind spot mirror of Figure 19.

30 Figure 23 is a perspective view of a shutter for the retractable blind spot mirror of Figure 19.

35 Figure 24 is a perspective view of a prism for the retractable blind spot mirror of Figure 19.

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Figure 25 is a sectional view of operation of retraction for mirror of Figure 19.

5 Figure 26 is a schematic representation of how light is refracted by a right angle prism and then refracted through a second right angle prism to see to the rear;

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

10 Traditionally due to the manner that mirrors were designed and installed on automobiles the driver's view was impeded by not having a comprehensive view on either side of the vehicle. Conventional side view mirrors on vehicles, do not provide total coverage of the viewing area on both sides of 15 the automobile. For the right side blind spot the driver has to turn his head to his right to an angle of around 120 degrees in order to check the blind spot. For the left side blind spot the driver has to turn his head to at least 90 degrees in order to check the blind spot. The driver must 20 do these two head movements in sequence and in split second timing in order to ensure his safety and the traffic on his sides before proceeding in changing lanes in a highway.

With reference to Figure 1 the typical viewing areas and 25 identification of the blind spots to the left and right of the vehicle are illustrated. In the subject vehicle A, conventional side view mirrors on the left and right side of the vehicle permit a driver to see the area between the area B. The areas C and D on the left and right side of the 30 subject vehicle A are characterized as the blind spots. The driver of subject vehicle A will not be able to see vehicles E or F using the conventional side view mirrors as they are in the blind spot. In order for the driver of vehicle A to check the blind spots on the left and right side of his 35 vehicle, the driver must turn his head to the side and rear to see directly to the blind spot to ensure no vehicles are present. The major advantage of the design of the present

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invention is that it minimizes the amount a driver must turn his head to the side and rear to see to the side and rear to ensure no vehicles are present.

5 The present invention is based on the concept of having a mirror system where the side viewing mirrors are moved into the vehicle. This allows the driver to see more directly into the "side view mirrors" in order to see along the side and to the rear of the vehicle without turning his head.

10 In order to move the "side view" mirrors into interior of the vehicle and improve the viewing area to enable the driver to also check the blind spot, the present invention makes use of the refractive properties of a prism,

15 preferably a right angle prism having two equal angles of 45° degrees and one angle of 90° degrees. The light enters one adjacent side, hits the hypotenuse and is refracted out thru the other side perpendicularly (at 90° degrees). This means when you look through one side you can see objects 90°
20 degrees to the left or right or up or down depending how you have positioned the mirror.

The right angle prism can be used in the mirror system of the present invention to see the area along the side of a
25 vehicle which is not viewable with conventional flat mirrors (the blind spot). In addition in one embodiment of the present invention two right angle prisms can be used in combination to see straight back.

30 Figure 2 illustrates schematically how light is refracted through a right angle prism so that it can be used to view objects at 90° to the side of the prism. The right angle prism may have its hypotenuse S3 coated to obtain the clearest view. If viewing through a first side S1 of the prism, the scene at right angles to side S1 can be viewed.
35 The mirror system of the present invention utilizes this property of a right angle prism. For example if the viewing

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side S1 of a right angle prism is perpendicular to a second side S2 of the prism, it can be directed (placed at an angle) to see a particular view in this case towards the blind spot. This means that what the driver is viewing is

5 the area 90 degrees to the left of the left side of the prism or 90 degrees to the right of the right side prism if the prism is reversed. While the above is referenced to a right angle prism, prisms with other angles can be used although the right angle prism optimizes the viewing area

10 that is seen by the driver.

If another reflective or refractive material is used in conjunction with a right angle prism the viewing angle through the face of the prism can be changed. For example Figure 13 shows how a flat mirror at about 60 degrees to the right angle prism can be used to view the blind spot.

20 In Figures 3 to 5 one embodiment of a mirror system according to the present invention is illustrated. The conventional side view mirrors have been replaced with devices installed onto the door frames to provide a view to the rear along the side of the vehicle and also to enable a 25 driver to see the blind spot without turning his head.

Figure 6 illustrates one embodiment of the left side blind spot and backview mirror of the type shown in Figures 3-5 for installation on the driver's side door frame. In this 30 embodiment the left side blind spot and backview mirror is located in a housing mounted on the door frame of the vehicle so there is a first section of the mirror housing in the interior of the vehicle and a second portion of the mirror housing on the outside of the vehicle. The first 35 section of the mirror housing has a generally rectangular rearwardly open box configuration with a first end adapted for attachment to the door frame of the vehicle, a second

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remote end and top, bottom and front walls. One or more prisms are mounted in the opening of the first section of the mirror housing. In the embodiment shown one right angle prism is utilized. The right angle prism has a first viewing side, a second side perpendicular to the first viewing side and a third side connecting the remote ends of first and second sides (i.e. the hypotenuse). The prism may be mounted in a manner to permit adjustment of the prism to accommodate drivers of different sizes however the present inventor has determined that due to the position of the prism in front of the driver adjustment is normally unnecessary and the prism can be fixed in position. The second section of the mirror housing has a generally rectangular rearwardly open box having one end adapted for attachment to the first end of the first section of the mirror housing; another or remote end and top, bottom and front walls. One or more reflective or refractive means are located in the opening of the second section. The second section is preferably equipped with means to protect it from damage and weather conditions. In the embodiment illustrated a protective transparent cover (preferably one way glass) may cover the opening in the second section of the mirror housing. In the embodiment illustrated, as best seen in Figure 7, a first flat mirror is mounted in the bottom rear of the opening of the second section of the mirror housing adjacent the remote end of the second side of the prism. The first flat mirror is mounted in a manner to permit the driver to look through the lower section of the first viewing side of the prism and see the blind spot area along the side of the vehicle. In order to view the blind spot the first flat mirror is preferably mounted at an angle of between 50 to 70 degrees, preferably about 60 degrees. The first flat mirror angle can optionally be adjusted preferably from about 1 to 5 degrees using electronic or mechanical means such as electromagnets. Figure 9 shows the pivot axle of the first flat mirror.

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In the embodiment illustrated, as best seen in Figure 7, a second flat mirror is mounted in the top rear of the opening of the second section of the mirror housing adjacent the remote end of the second side of the prism. The second flat mirror is mounted in a manner to permit the driver to look through the top section of the first viewing side of the prism and see the backview area along the side of the vehicle. In order to view the backview area the second flat mirror is preferably mounted at an angle of between 35 to 50 degrees, preferably about 45 degrees. The second flat mirror angle can optionally be adjusted preferably from about 1 to 5 degrees using electronic or mechanical means such as electromagnets. Figure 8 shows the pivot axle for the second flat mirror.

15 In the embodiment of Figures 6 to 9 a vertical outer wall is provided from the top to the bottom of the mirror housing to prevent and between the edge of the prism and the protective glass to prevent the driver from viewing directly into the
20 first or second flat mirrors.

Figure 26 is a schematic representation of how light is refracted by a right angle prism and then refracted through a second right angle prism to see to the rear. Using this concept, a different embodiment of a combination left side view mirror and the blind spot mirror is shown in Figures 10 to 12. The combination side view mirror and the blind spot mirror is located in a housing mounted on the vehicle door frame similar to the embodiment shown in Figures 6 to 9. In this embodiment two right angle prisms are mounted in the opening of the first section of the mirror housing. Both of the right angle prisms have a first viewing side, a second side perpendicular to the first viewing side and a third side connecting the remote ends of the first and second sides (i.e. the hypotenuse). The prisms are mounted in a manner to permit adjustment of the prism to accommodate drivers of different sizes. One prism is used to see the

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rear view along the side of the vehicle (the rear view prism) and the other prism is used to view the blind spot (the blind spot prism). The second section of the mirror housing has a generally rectangular rearwardly open box

5 having one end adapted for attachment to the first end of the first section of the mirror housing, another or remote end and top, bottom and front walls. A flat mirror is mounted in the rear of the opening of the second section of the mirror housing adjacent the remote end of the second

10 side of the blind spot prism.. The flat mirror is mounted in a manner to permit the driver to look through the first viewing side of the blind spot prism and see the blind spot area along the side of the vehicle. If the flat mirror is mounted at an angle of between 55 to 65 degrees the blind

15 spot can be seen. A third right angle prism is mounted in the opening of the second section of the mirror housing. The third right angle prism has a first rear facing side, a second side perpendicular to the first rear facing side and a third side connecting the remote ends of the first and

20 second sides (i.e. the hypotenuse). The third prism is mounted so its second side is parallel to the second side of the rear view prism to thereby permit the driver to see along the side of the vehicle. The mirror system is further equipped with means to protect it from damage and weather

25 conditions.

Figures 14 and 15 illustrates one embodiment of the right side blind spot and backview mirror of the type shown in Figures 3-5 for installation on the passenger's side door frame. In this embodiment the right side blind spot and backview mirror is located in a housing mounted on the door frame of the vehicle so there is a first section of the mirror housing in the interior of the vehicle and a second portion of the mirror housing on the outside of the vehicle.

30 35 The first section of the mirror housing has a generally rectangular rearwardly open box configuration with a first end adapted for attachment to the door frame of the vehicle,

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a second remote end and top, bottom and front walls. A transparent glass cover is shown over the opening in the first section.

- 5 The second section of the mirror housing has a generally rectangular rearwardly open box having one end adapted for attachment to the first end of the first section of the mirror housing, another or remote end and top, bottom and front walls. A flat mirror is mounted in the rear of the
10 opening of the second section of the mirror housing. In the embodiment shown it is mounted in the upper half of the second section. The flat mirror is mounted in a manner to permit the driver to look through the opening in the first section of the mirror housing and see backview area along
15 the side of the vehicle. If the flat mirror is mounted at an angle of between 55 to 65 degrees the blind spot can be seen. The flat mirror preferably is adjustable. A prism, preferably a right angle prism is mounted in the opening of the second section of the mirror housing. The prism has a
20 first rear facing side, a second side perpendicular to the first rear facing side and a third side connecting the remote ends of the first and second sides (i.e. the hypotenuse). The prism is mounted so to permit the driver to see through the second side of the prism and see the blind
25 spot along the side of the vehicle. The mirror system is further equipped with means to protect it from damage and weather conditions. In the embodiment shown the protective coating is a transparent glass cover over the opening in the second section
30 Another embodiment of the right side blind spot and backview mirror of the type shown in Figures 3-5 for installation on the passenger's side door frame can be used. The right side blind spot and backview mirror is similar to the embodiment shown in Figures 14 and 16 except two prisms are used to view the blind spot, one in the first section of the mirror housing and one in the second section of the mirror housing.
35

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The mirror system of the present invention not only eliminates the blind spot on both sides of the automobile it also reduces the external portion of the mirror by up to 5 half the current size. The reduction in drag due to the smaller surface area of the portion of the mirror system outside the vehicle will provide significant benefits.

As illustrated in Figure 3, the mirror system of the present 10 invention can be installed inside a car, at the area above the dashboard near the door frame or it can become part of the door frame at the area about where the external mirror is attached. It can provide a clear and unimpeded view of the blind spot area.

15 For the left side of the driver this system allows the driver to look directly into the prism which is placed at the location described previously and see both the backview and the blind spot area without having to turn his head 20 left. For the right side of the driver the driver turns his eyes and looks into the device and sees both the backview and the blind spot area without turning his head 120 degrees..

25 This mirror not only eliminates the blind spot areas on both side of the automobiles but it can also make the future design of the external mirrors half of their current size or eliminate them entirely. The viewing area of what the external mirrors provide may be covered by the internal back 30 mirror which all cars equipped with.

The reduction of drag due to the smaller size of external mirrors or their total elimination will be significant and will result in better fuel consumption for the car.

35 Adjustment of the flat mirrors may be accomplished using conventional mechanical or electromagnetic means. For

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example an electromagnet is placed behind the flat mirror and another one is placed directly opposite on the internal housing wall of the device. The flat mirror is hinged at one point. Also a small spring maybe attached to both the back 5 of the flat mirror and the side of the housing wall where the flat mirror lies. When the angle of viewing needs to be adjusted an electrical switch will activate the electromagnet on the housing wall which will push the mirror inwards. The process can be reversed.

10 The benefits of the mirror system of the present invention include:

a. It comprehensively eliminates the blind spot area on both left and right side of the car

15 b. It provides a crystal clear view of the bind spot(s) area

c. It can be adjusted to accommodate the seating position of the driver

20 d. Objects appear in it in actual sizes - there is no distortion

25 e. Objects are shown at real distances, e.g. object is as far or near as it appears to be

f. It can be weather proof (protected by snow, ice, fog)

30

With reference to Figures 17 and 18, an embodiment of a side view mirror for a vehicle is illustrated incorporating the characteristics of the right angle prism in order to view 35 the typical blind spot. Figure 18 illustrates a typical automobile left side mirror. The side mirror has a planar mirror mounted in a mirror housing adapted to be attached to

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- the side of a vehicle. In the embodiment shown, the mirror housing has a rectangular rearwardly open box configuration with a first end adapted for attachment to the vehicle and a remote end. The mirror housing has a top, bottom and front wall. The mirror is mounted in the rear opening of mirror housing. In the embodiment illustrated, a right angle prism is located at the outer end of the side mirror to permit the driver to view the blind spot.
- With reference to Figures 19 and 20, another embodiment of a mirror system that includes a blind spot using a right angle prism is illustrated. Figure 19 illustrates a typical automobile left side mirror. The side mirror has a planar mirror mounted in a mirror housing adapted to be attached to the side of a vehicle. In the embodiment shown, the mirror housing has a rectangular rearwardly open box configuration with a first end adapted for attachment to the vehicle and a remote end. The mirror housing has a top, bottom and front wall. The mirror is mounted in the rear opening of mirror housing. In the embodiment illustrated, a right angle prism is located at the outer end of the side mirror to permit the driver to view the blind spot. In the embodiment illustrated, a right angle prism is pivotally mounted adjacent the remote end of mirror housing. The prism is connected to a mirror plate that may rotate on axis to permit adjustment. When the prism is in the closed position, shutter activates to cover the opening in housing through which the prism and mirror plate move from the open to closed position and vice versa. Similarly before the prism can move from the closed to the open position shutter retracts into housing. While Figures 19 and 20 illustrate the right angle prism mounted so it can be retracted within the housing, the present invention is not so limited to.
- The housing must be sized to accommodate the prism and mirror plate when they are fully retracted within the housing. Shutter preferably moves along a track attached to

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the inside surfaces of the top and bottom adjacent the remote end to allow shutter to travel when it is retracted to an open and closed position.

5 As shown in Figure 21, the mirror-plate has a vertical base and top and bottom plate sections. The prism is mounted with its hypotenuse side against base. There are alternative ways of attaching the prism-mirror to the mirror-plate. The back of the vertical base is preferably shaped in a round manner
10 to fit the path of the radius of the mirror plate and prism when it is in motion. This design of the back of the vertical base helps reduce the wind resistance when the automobile is in motion and in addition shows the retractable mirror being a part or a natural extension of
15 the housing of the whole mirror. The mirror plate is mounted to permit rotation about axis. The shutter and the mirror-plate (carrying the prism) preferably are moved by electric power activated by a switch in the vehicle. Moreover the mirror plate that carries the right angle prism mirror can
20 be adjusted by an electrical switch from inside the car in such a manner that the blind spot is viewed unimpeded and in sync with the sitting position of the driver. This adjustment can be done independently for both mirrors on either side of the automobile.

25 The present invention is not limited to any particular method of rotating the right angle prism from an open to a closed position. Both electronic and mechanical methods are practical. Figure 25 illustrates one method of adjustment.
30 The mirror housing has a circular track around its outer end. At one end of track is a thin electromagnet. The shutter runs along the track. One end of the shutter is coated with a metallic material or the shutter can be made of a metallic material. A second electromagnet is located on
35 a internal wall separating the side view mirror from the right angle prism. The mirror plate is also preferably made of metal. An electronic switch is installed in the housing

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which connects to both electro magnets and. The switch can be used to activate the magnets and cause either the shutter to move along track or the mirror plate to rotate about its axis.

5 With this present invention the blind spots on either side are eliminated and the driver does not have to keep moving his head left and right in order to ensure clearance of space on either side before proceeding in changing lanes.

10 Moreover the driver when looking at the prism mirror is seeing the items/ objects in it at real dimensions. That is what he/she is looking at is as far or as near as it appears. This is mentioned because many drivers install
15 small convex mirrors on the outer mirrors (left & right) in order to get a glimpse of the blind spot area. The items/objects appearing in a convex mirror are closer than they appear. This definitely constitutes a danger factor for the driver when he's to change lanes.

20 Thus the driver will only look at either mirror, left and right in a normal manner and will be able to view the blind spot on either side of the vehicle/ automobile.

25 Another advantage of this present invention is the fact that it is retractable.

This means that the retractable mirror will move inside its housing which is the end part of the mirror housing frame
30 and the shutter blind activated, once the automobile has stopped and turned off. The process is reversed of course once the automobile is started on, the shutter blind opens and the mirror prism is moved to the position where it can provide a view of the blind spot to the driver. This motion
35 is done automatically for both left and right mirrors of the automobile. The driver will have the option of adjusting

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slightly though the positioning of the mirror prism towards
pointing to the blind spot area.

This retract ability of the prism mirror will make the
5 automobile mirror as a whole more compact and thus protected
from elements and vandals.

Although various preferred embodiments of the present
invention have been described herein in detail, it will be
10 appreciated by those skilled in the art, that variations may
be made thereto without departing from the spirit of the
invention or the scope of the appended claims.

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THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A mirror system for a vehicle comprising a
5 driver's side mirror located in a mirror housing mounted on the vehicle so there is a first section of the mirror housing in the interior of the vehicle and a second portion of the mirror housing on the outside of the vehicle; said first section of the mirror housing has a rearwardly open
10 box configuration with a first end adapted for attachment to the vehicle, a second remote end and top, bottom and front walls; one or more prisms mounted in the opening of the first section of the mirror housing, said prisms have a first viewing side, a second side connected to one side of
15 the first viewing side and a third side connecting the remote ends of first and second sides; said second section of the mirror housing has a generally rearwardly open box having one end adapted for attachment to the first end of the first section of the mirror housing, another or remote
20 end and top, bottom and front walls wherein one or more reflective or refractive means are mounted in the rear of the opening of the second section of the mirror housing at an angle to the second side of the prism(s) in the first section of the mirror housing so that when the driver looks
25 through the first viewing side of the prism he can see either or both along the side of the vehicle and the blind spot area along the side of the vehicle.

2. A mirror system for a vehicle comprising a
30 combination driver's side view mirror and blind spot mirror said combination driver's side view mirror and blind spot mirror located in a housing mounted on the vehicle so there having a first section of the mirror housing in the interior of the vehicle and a second portion of the mirror housing on the outside of the vehicle; and means are provided whereby a driver can see the rear view along the side of the vehicle and view the blind spot.

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3. A blind spot mirror for use with a typical vehicle side view mirror mounted in a mirror housing adapted to be attached to the side of a vehicle wherein said mirror
5 housing has a rearwardly open box configuration with a first end adapted for attachment to the vehicle, a remote end and top, bottom and front walls, a vehicle side view mirror is mounted in the rear opening of the mirror housing wherein said blind spot mirror comprises a right angle prism mounted adjacent the remote end of the mirror housing in a manner to permit adjustment of the prism to accommodate drivers of
10 different sizes.

4. A retractable blind spot mirror for use with a typical vehicle side mirror mounted in a housing adapted to be attached to the side of a vehicle said housing having a generally rectangular rearwardly open box configuration with a first end adapted for attachment to the vehicle, a remote end, top, bottom and front walls wherein the vehicle side mirror is mounted in the rear opening of housing, said retractable blind spot mirror comprising a right angle prism pivotally mounted adjacent the remote end of said housing wherein said prism is connected to a mirror plate which rotates from an open position such that when the prism is in
20 the closed position, a shutter activates to cover the opening in said housing through which the prism and mirror plate move from the open to closed position and vice versa.
25

5. A retractable blind spot mirror according to claim 4
30 wherein before the prism can move from the closed to the open position the shutter retracts into said housing.

6. A retractable blind spot mirror according to claim 5 wherein said shutter moves along a track attached to the
35 inside surfaces of the top and bottom of said housing adjacent the remote end to allow shutter to travel when it is retracted to an open and closed position.

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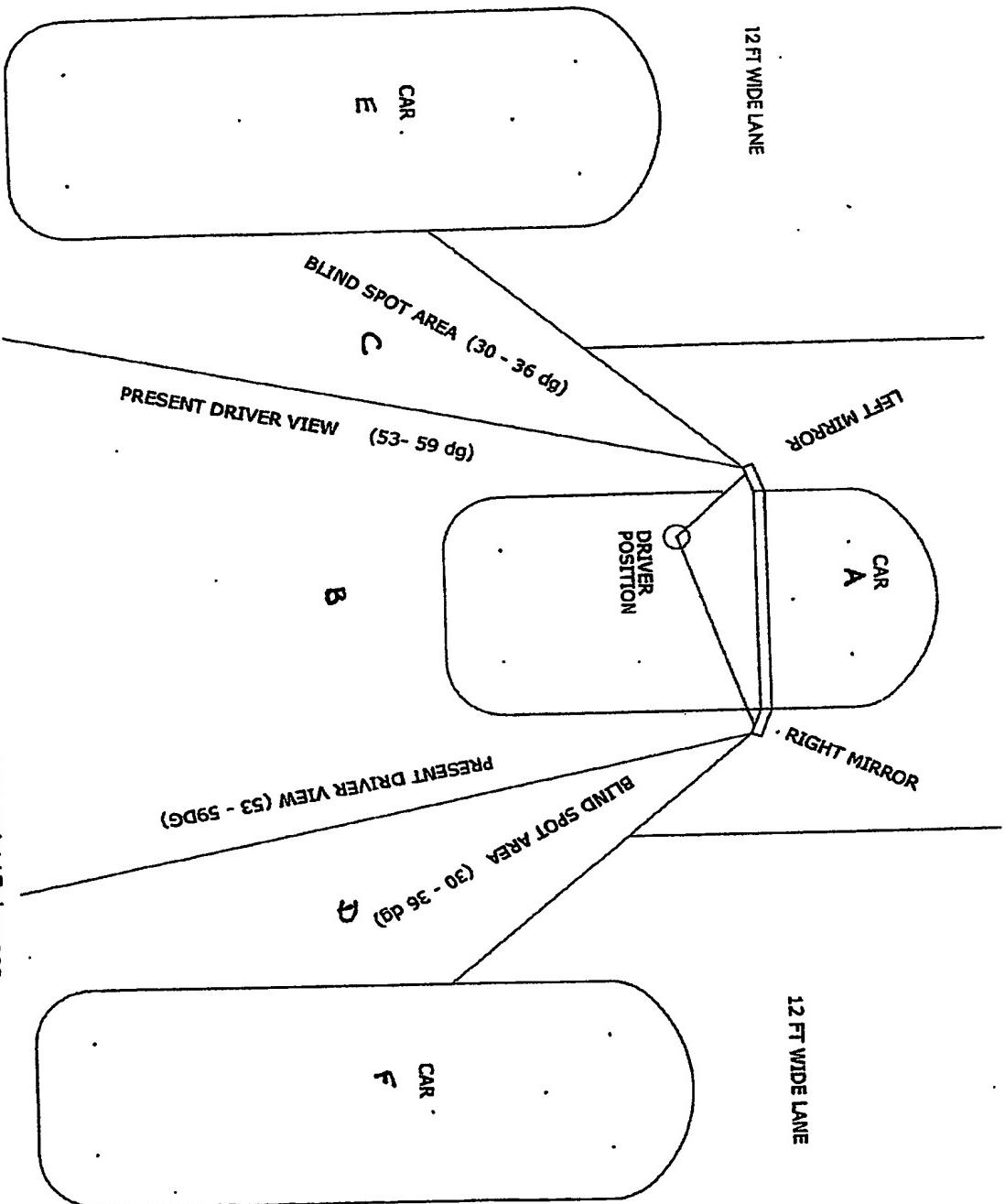
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7. A retractable blind spot mirror according to claim 4 wherein the mirror-plate has a vertical base and top and bottom plate sections to permit said prism to be mounted with its hypotenuse side against said vertical base.
- 5 A retractable blind spot mirror according to claim 4 wherein the back of the vertical base is shaped to fit the path of the radius of the mirror plate and prism when it is in motion to help reduce the wind resistance when the
- 10 automobile is in motion.

AYOUT ANALYSIS OF THE BLIND SPOTS ON CARS.

Figure 1

The Driver is looking at the left mirror at an angle between 100 and 115 degrees.
The frame of the mirror is tilted 20 degrees inwards.



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FIGURE 2

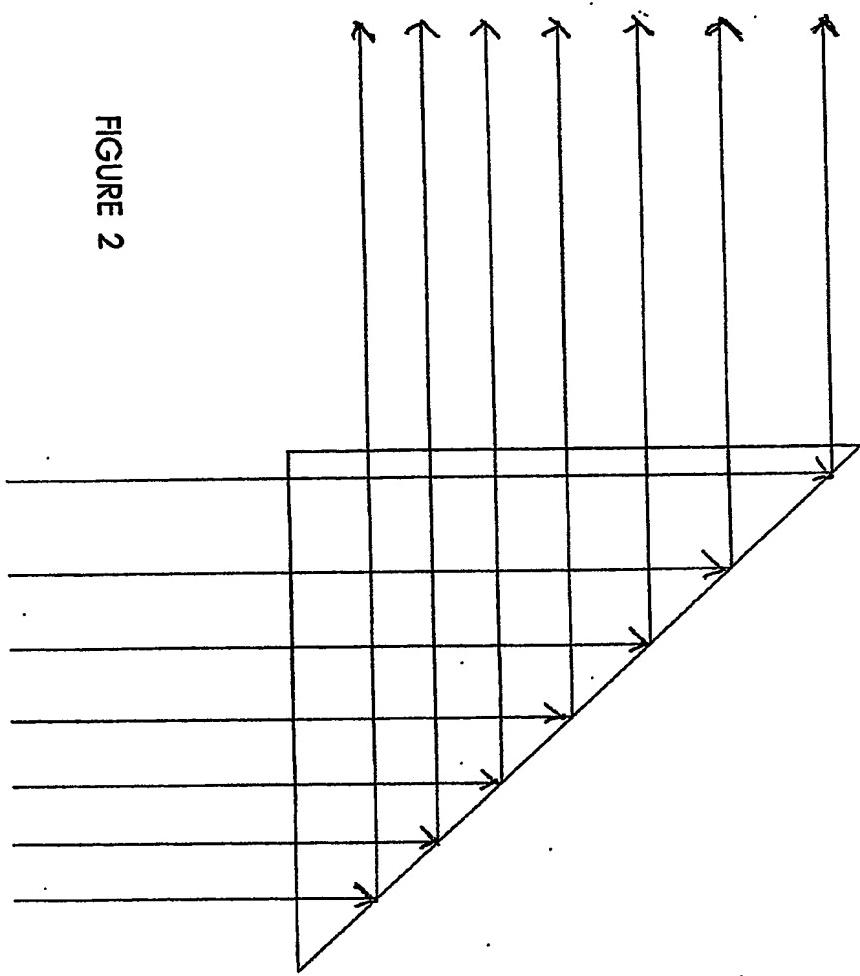


Figure 3

MIRROR SYSTEM installed on door frames.

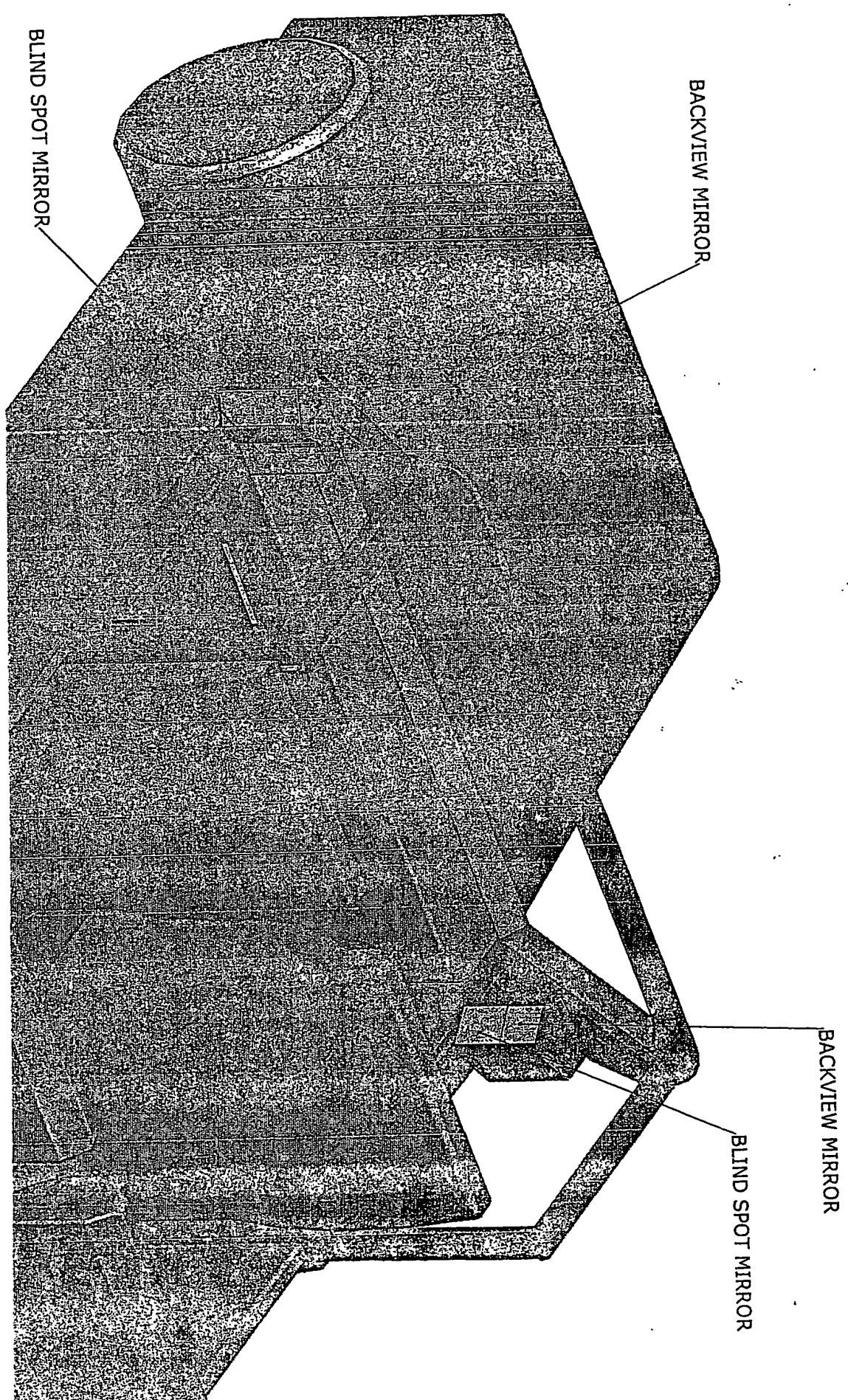


Figure 4

MIRROR SYSTEM installed on door frames

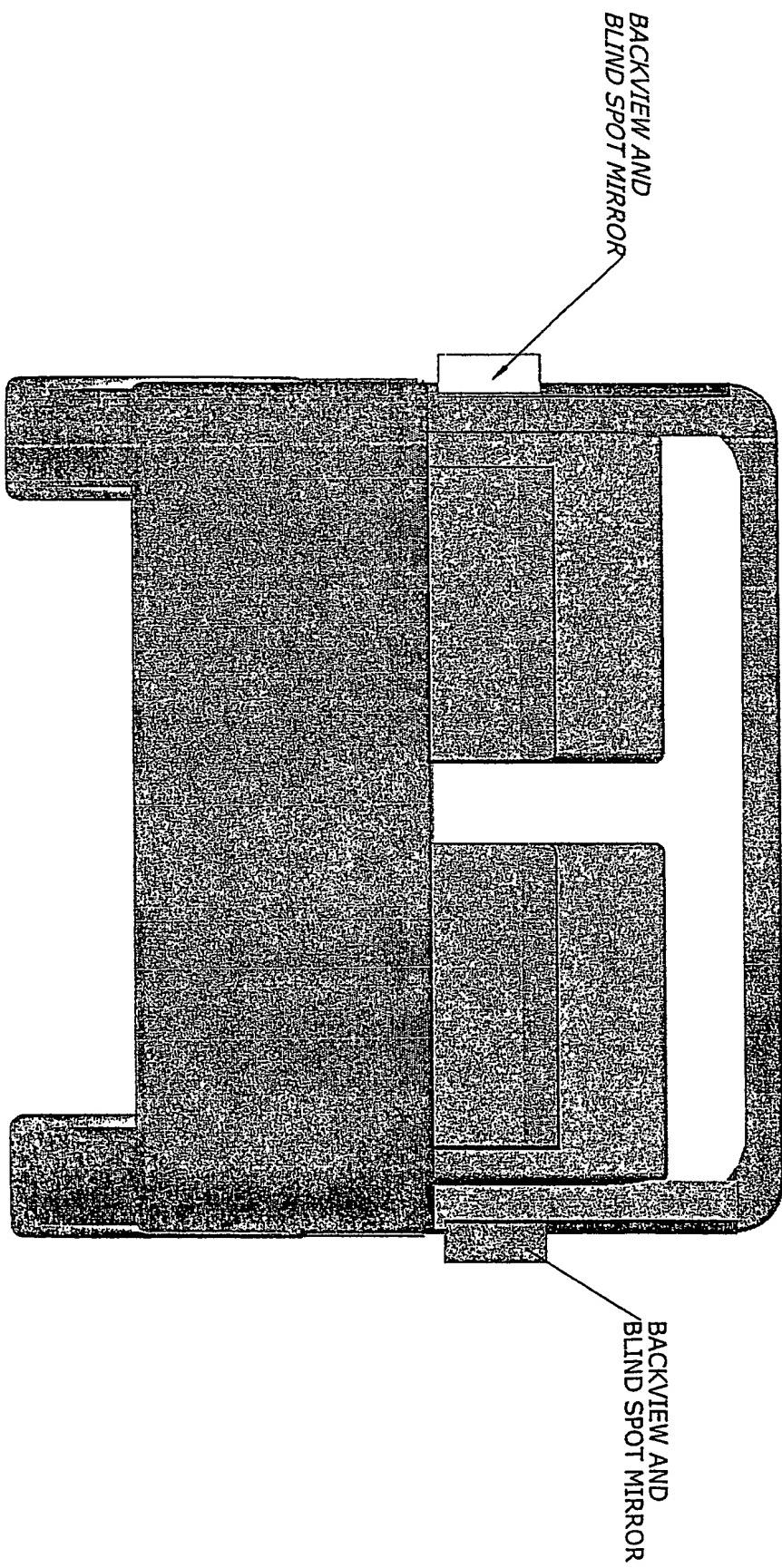
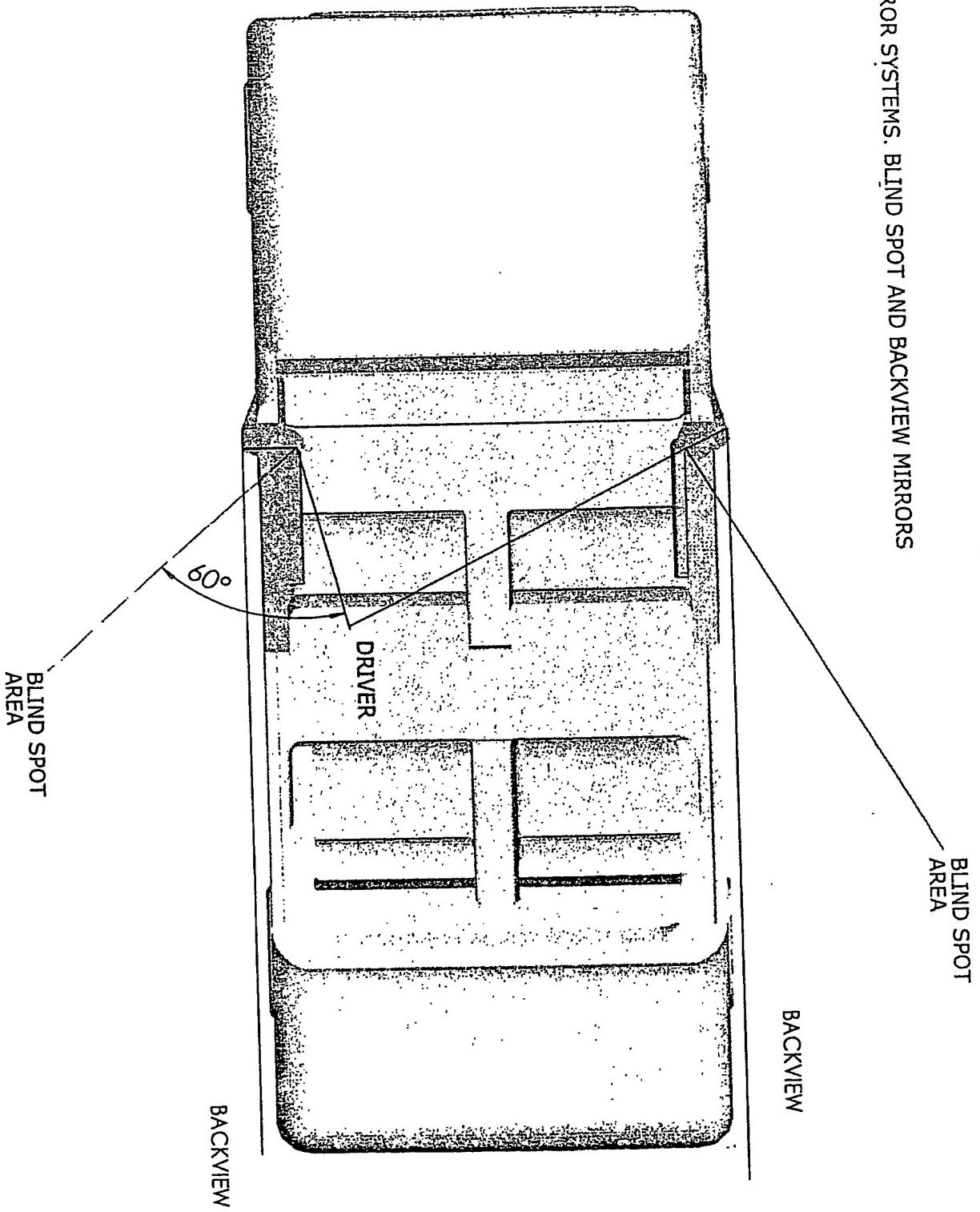


Figure 5

MIRROR SYSTEMS. BLIND SPOT AND BACKVIEW MIRRORS



LEFT SIDE BLIND SPOT AND BACKVIEW AUTOMOBILE MIRROR

Through Top half of prism one views the Backview area

Figure 6

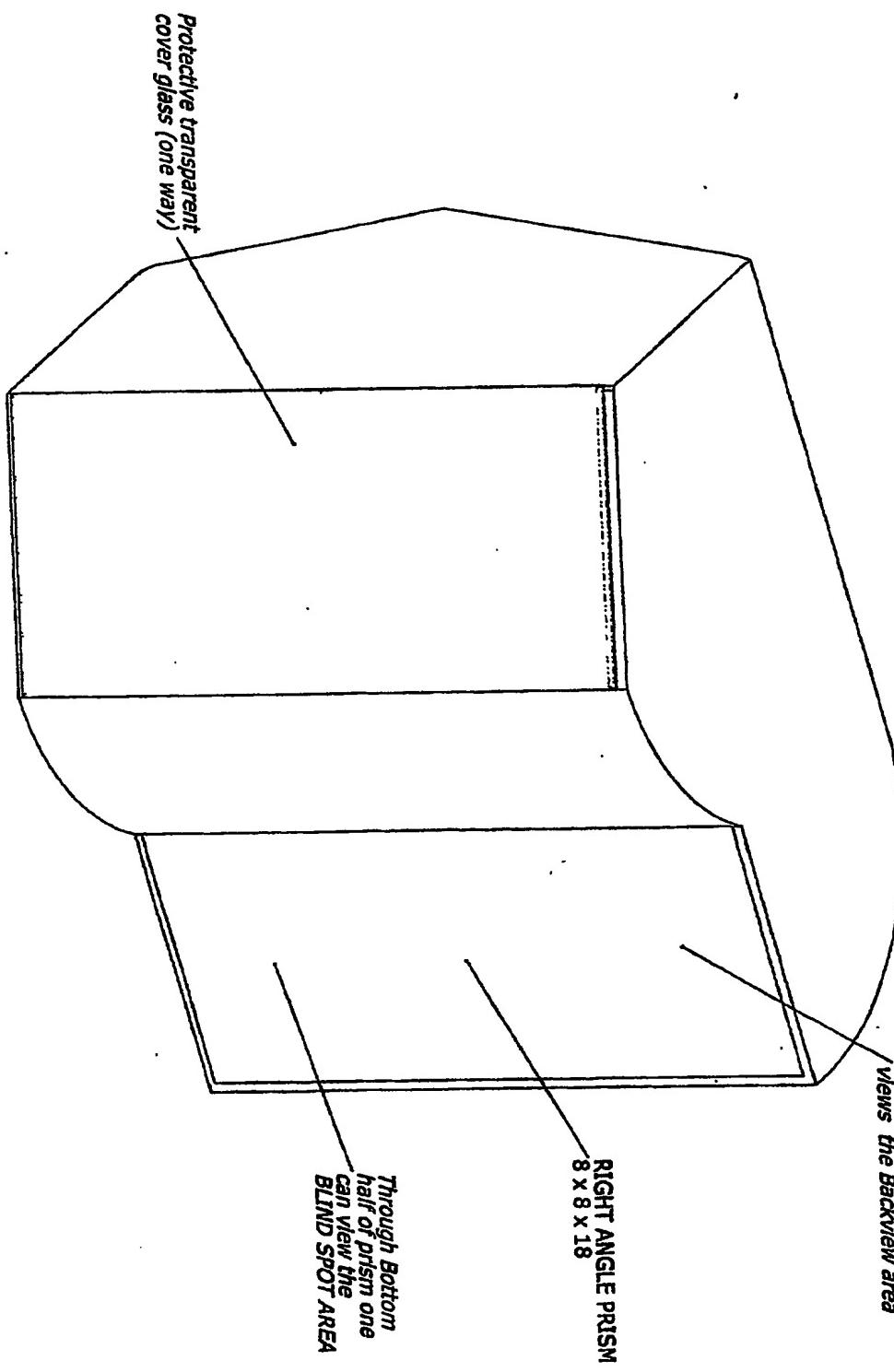


Figure 7

LEFT SIDE BLIND SPOT AND BACKVIEW AUTOMOBILE MIRROR

Through Top half of prism
views the Backview area

FLAT adjustable mirror
for BACKVIEW AREA

RIGHT ANGLE PRISM
 $8 \times 8 \times 18$

Through Bottom
half of prism one
can view the
BLIND SPOT AREA

FLAT adjustable mirror
for BLIND SPOT AREA

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Figure 8

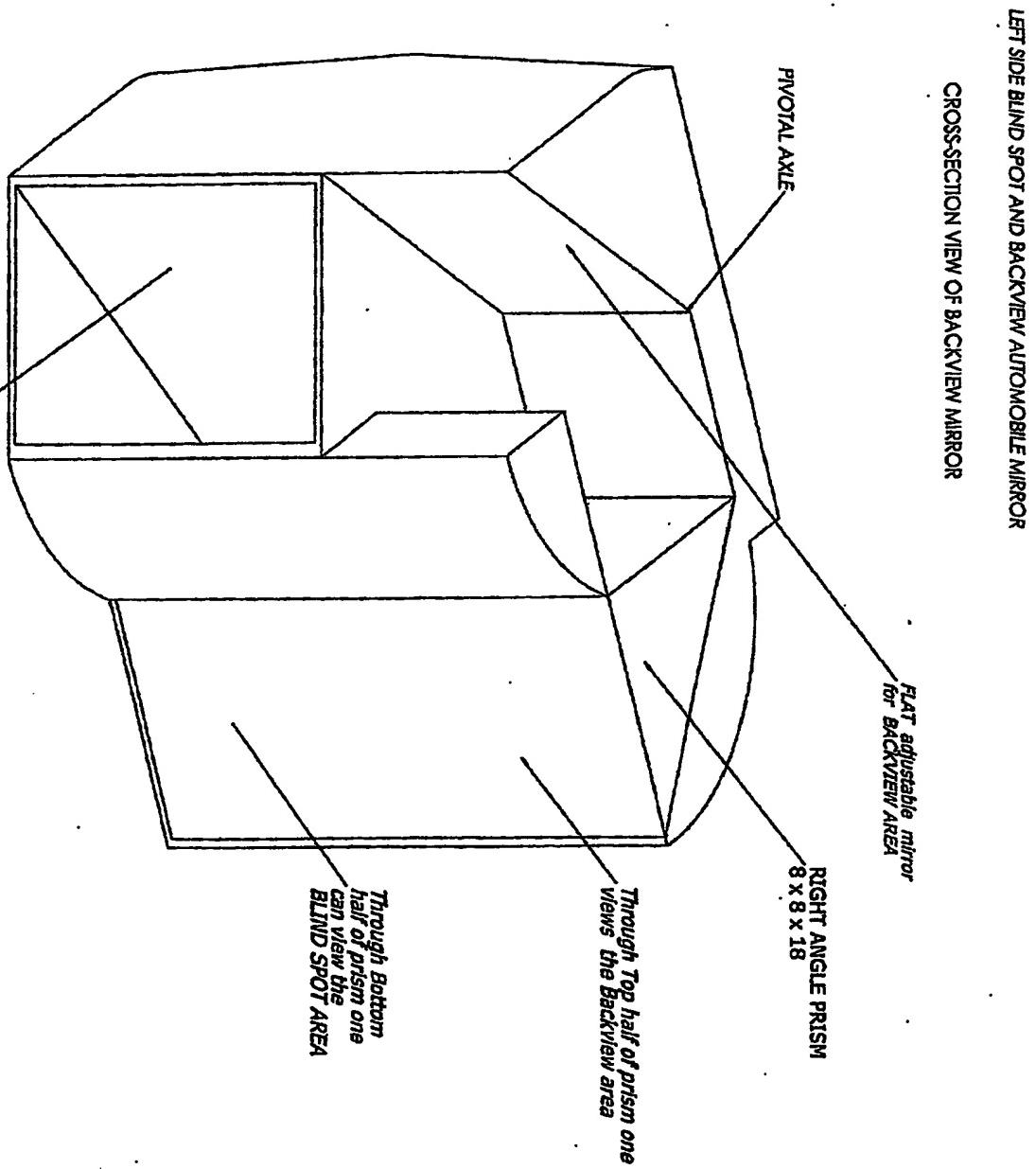
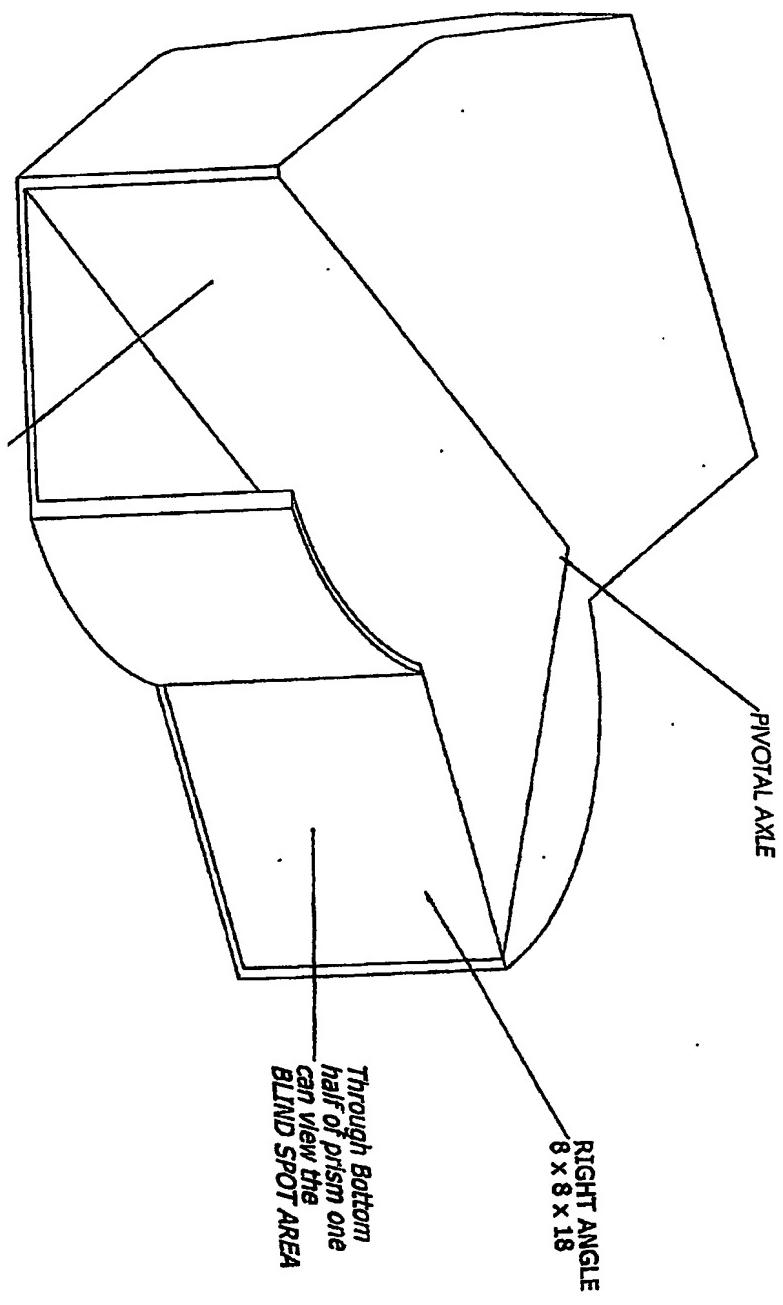


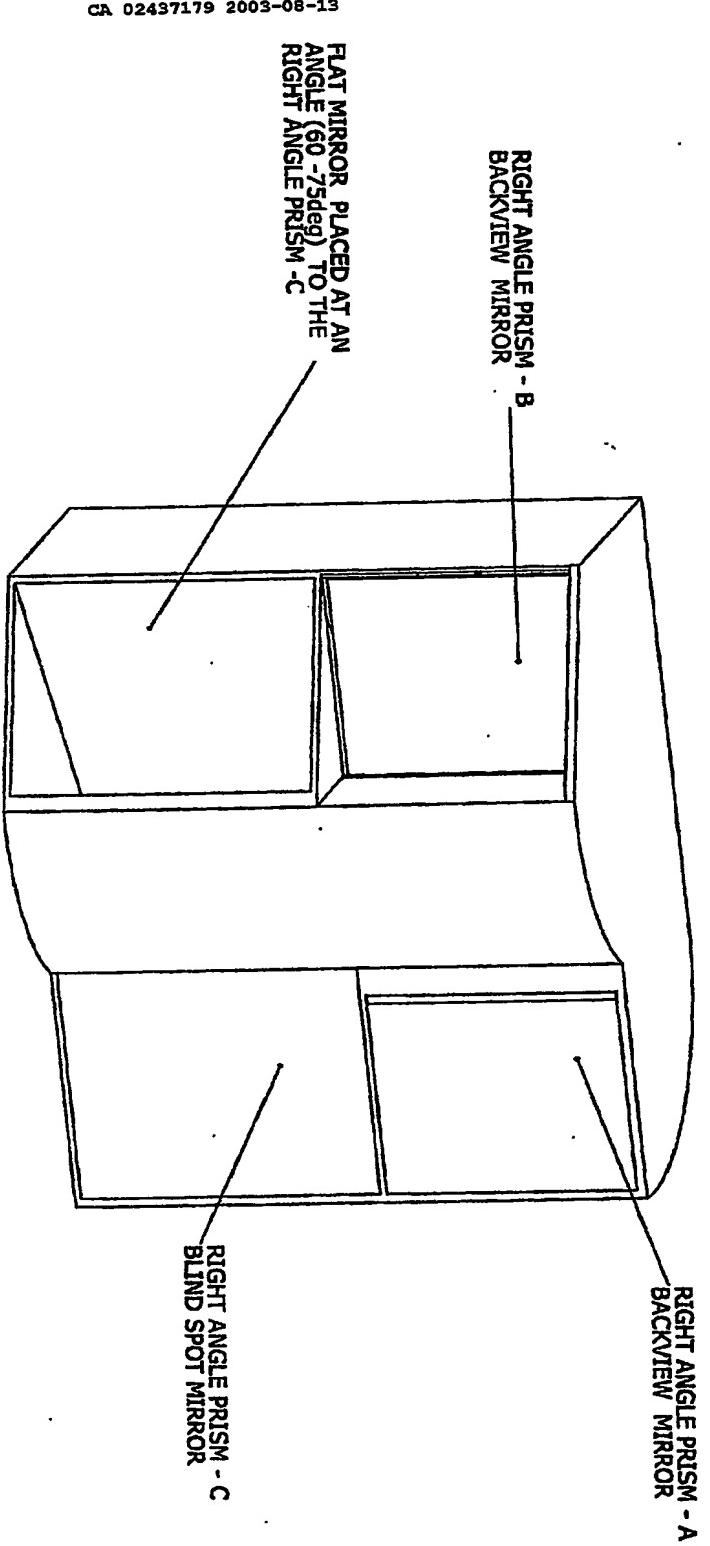
Figure 9

LEFT SIDE BLIND SPOT AND BACKVIEW AUTOMOBILE MIRROR

CROSS-SECTION VIEW OF BLIND SPOT MIRROR



BLIND SPOT AND BACKVIEW AUTOMOBILE MIRRORS - LEFT SIDE



This is a combination mirror that provides:

1. the backview (straight back) and
2. the blind spot area at the left side of the automobile.
It is designed to be installed on the door frame of an automobile.

Figure 10

BLIND SPOT AND BACKVIEW AUTOMOBILE MIRRORS - LEFT SIDE

CROSS SECTION OF BACKVIEW MIRROR

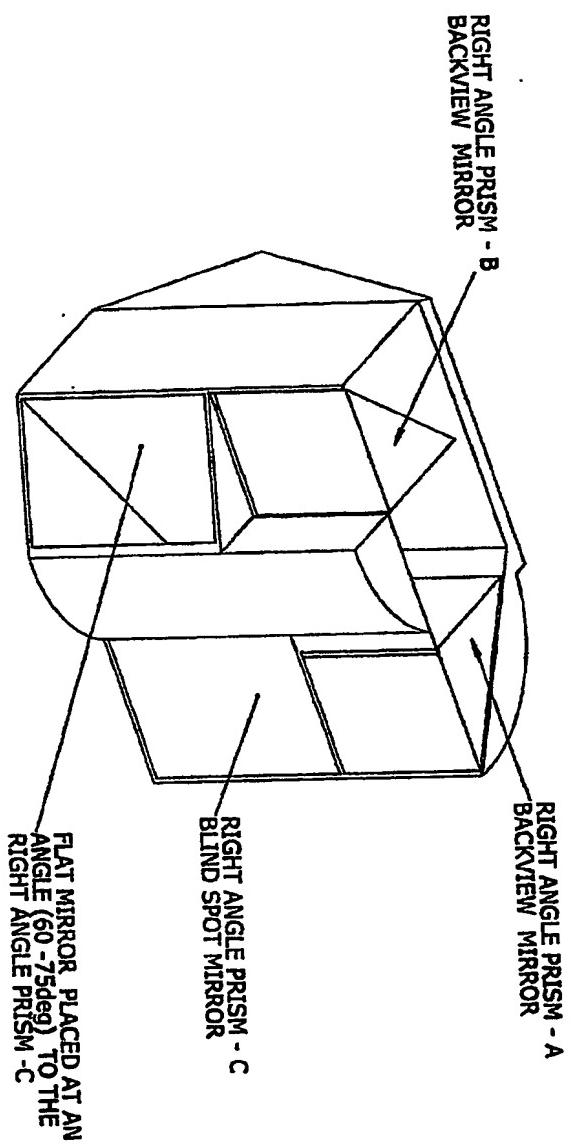


Figure 11

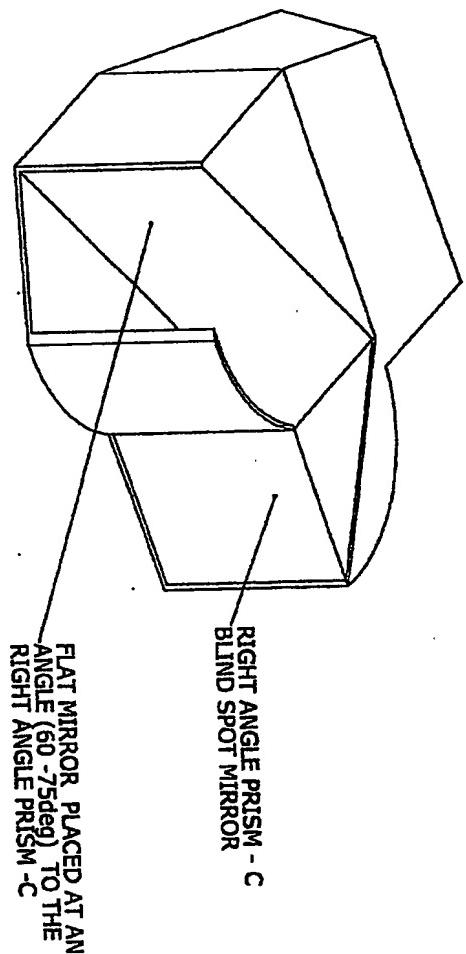
This is a combination mirror that provides:

1. the backview (straight back) and
 2. the blind spot area at the left side of the automobile.
- It is designed to be installed on the door frame of an automobile.

BLIND SPOT AND BACKVIEW AUTOMOBILE MIRRORS - LEFT SIDE

CROSS SECTION OF BLIND SPOT MIRROR

Figure 12



This is a combination mirror that provides:

1. the backview (straight back) and
2. the blind spot area at the left side of the automobile.
It is designed to be installed on the door frame of an automobile.

The driver is looking at the right angle prism A ideally as shown and can view the blind spot area thru the flat mirror. The angle between the flat mirror and the right angle prism can be adjusted since the flat mirror may swing open or close around the pivotal axle. If the angle needs to be bigger than what is shown then the flat mirror has to be longer(wider).

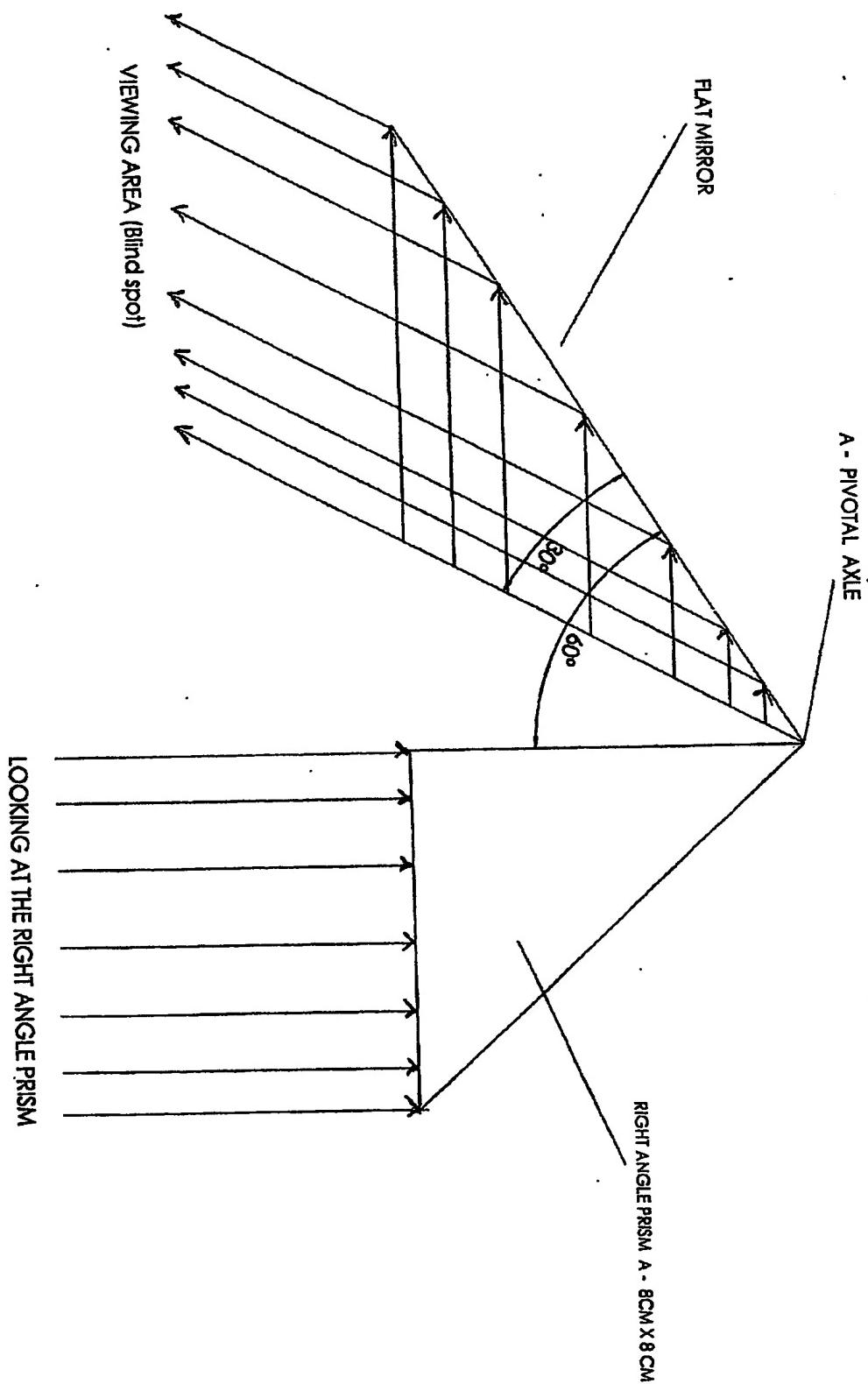


Figure 13

BLIND SPOT AND BACKVIEW AUTOMOBILE MIRROR SYSTEM FOR RIGHT DOOR

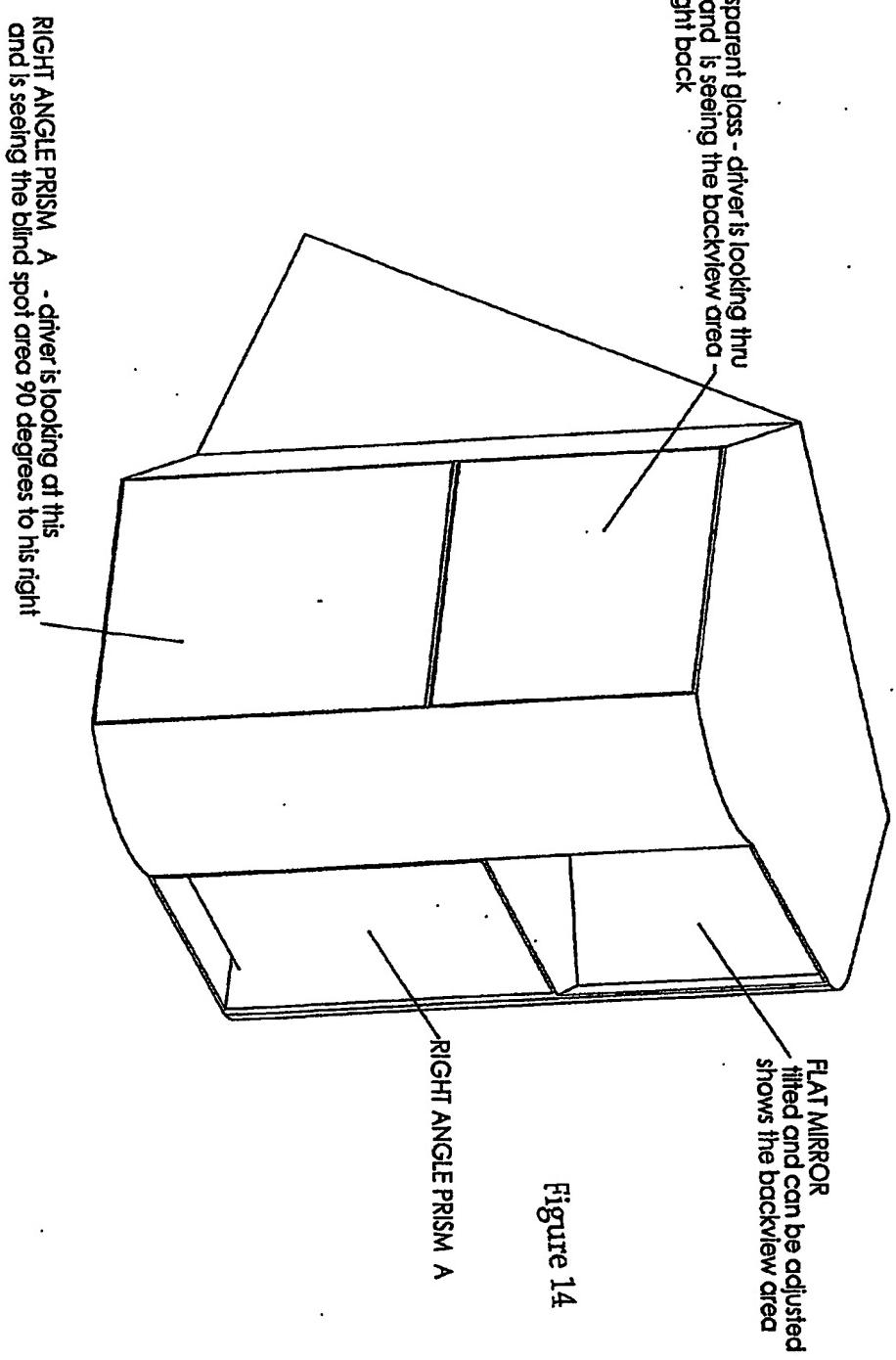


Figure 14

BLIND SPOT AND BACKVIEW AUTOMOBILE MIRROR SYSTEM, FOR RIGHT DOOR

CROSS SECTION OF BACKVIEW MIRROR FOR RIGHT SIDE OF CAR

FLAT MIRROR
tilted and can be adjusted
shows the backview area

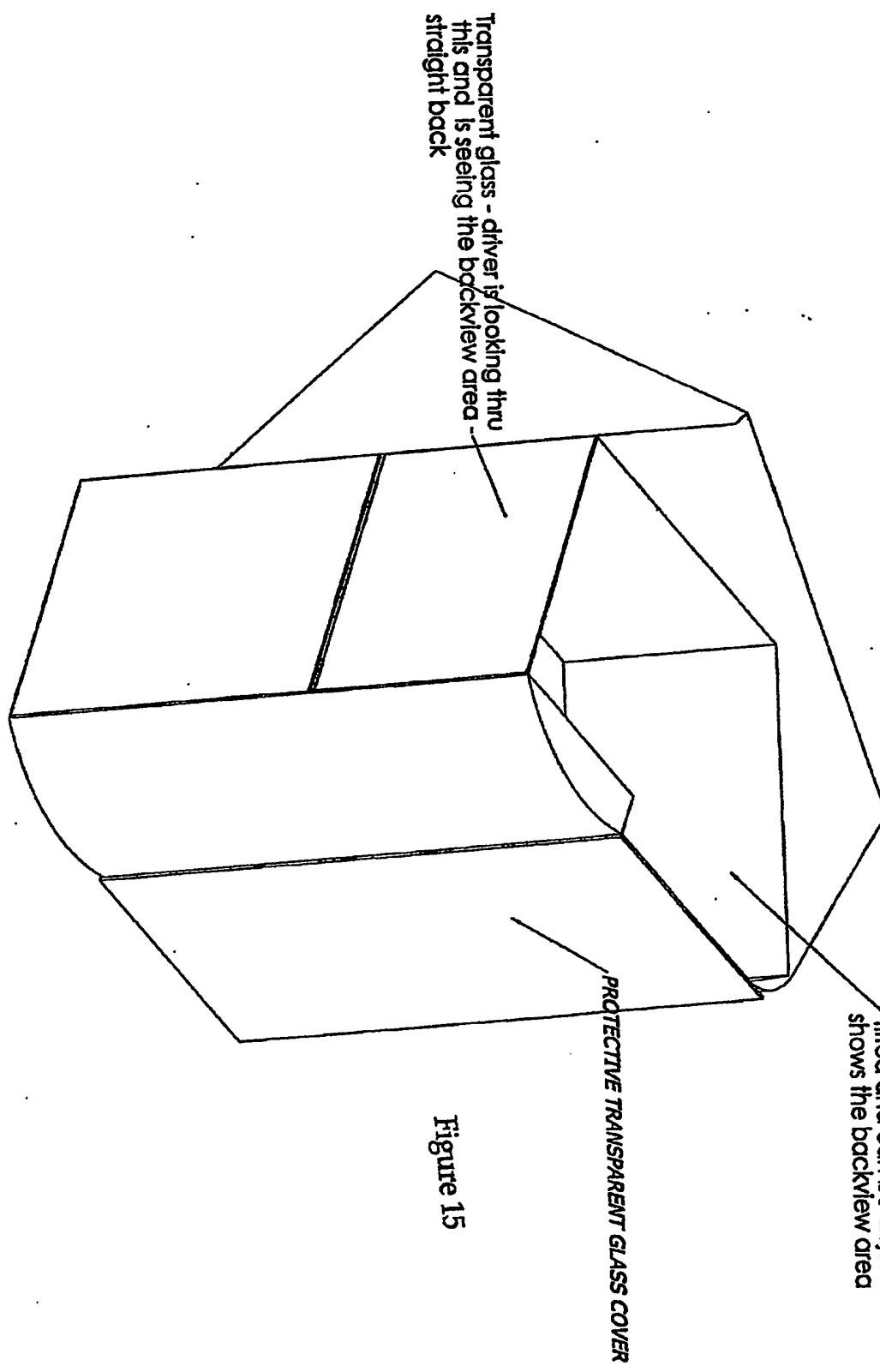


Figure 15

BLIND SPOT AND BACKVIEW AUTOMOBILE MIRROR SYSTEM FOR RIGHT DOOR

CROSS SECTION OF BLIND SPOT MIRROR OR
RIGHT ANGLE PRISM FOR RIGHT SIDE OF CAR
(8 x 8 x 10) cm

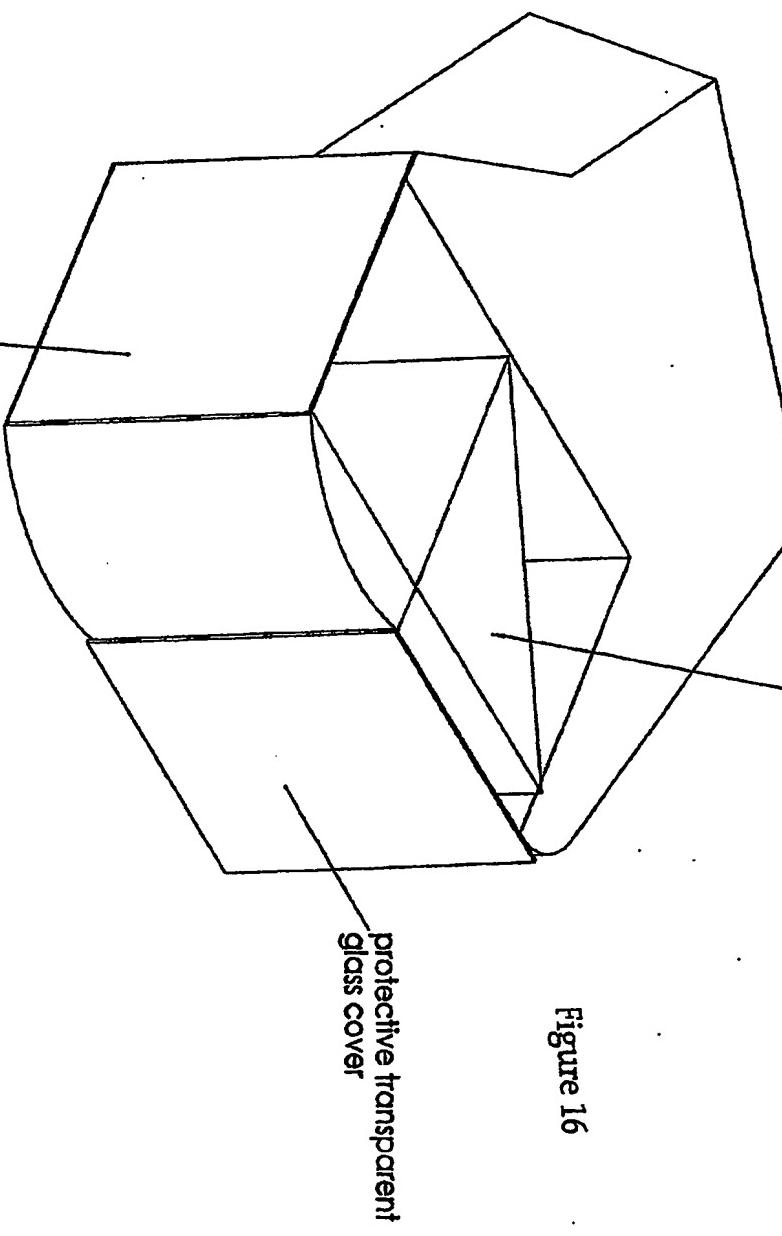
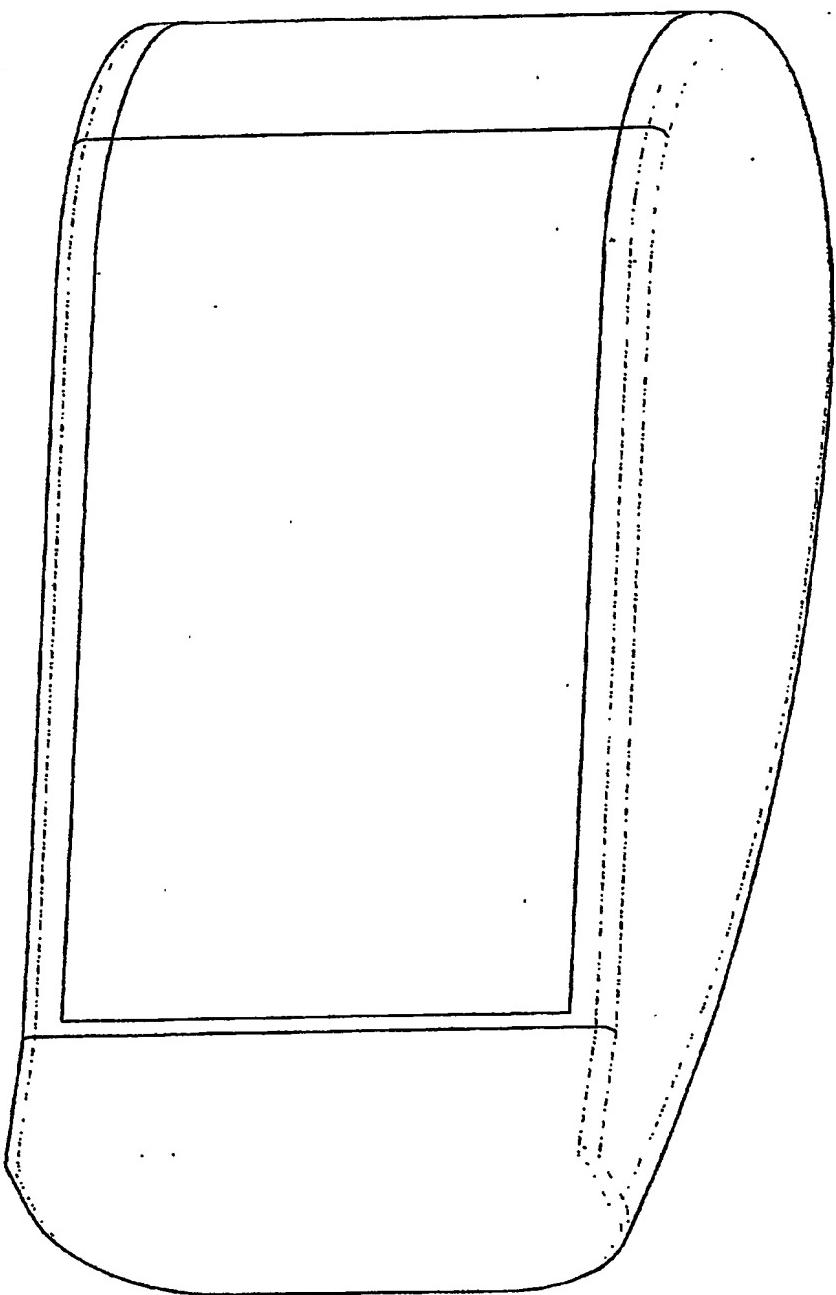


Figure 16

Transparent glass - driver is looking this protective cover and sees the right angle prism placed inside and sees the blind spot area.

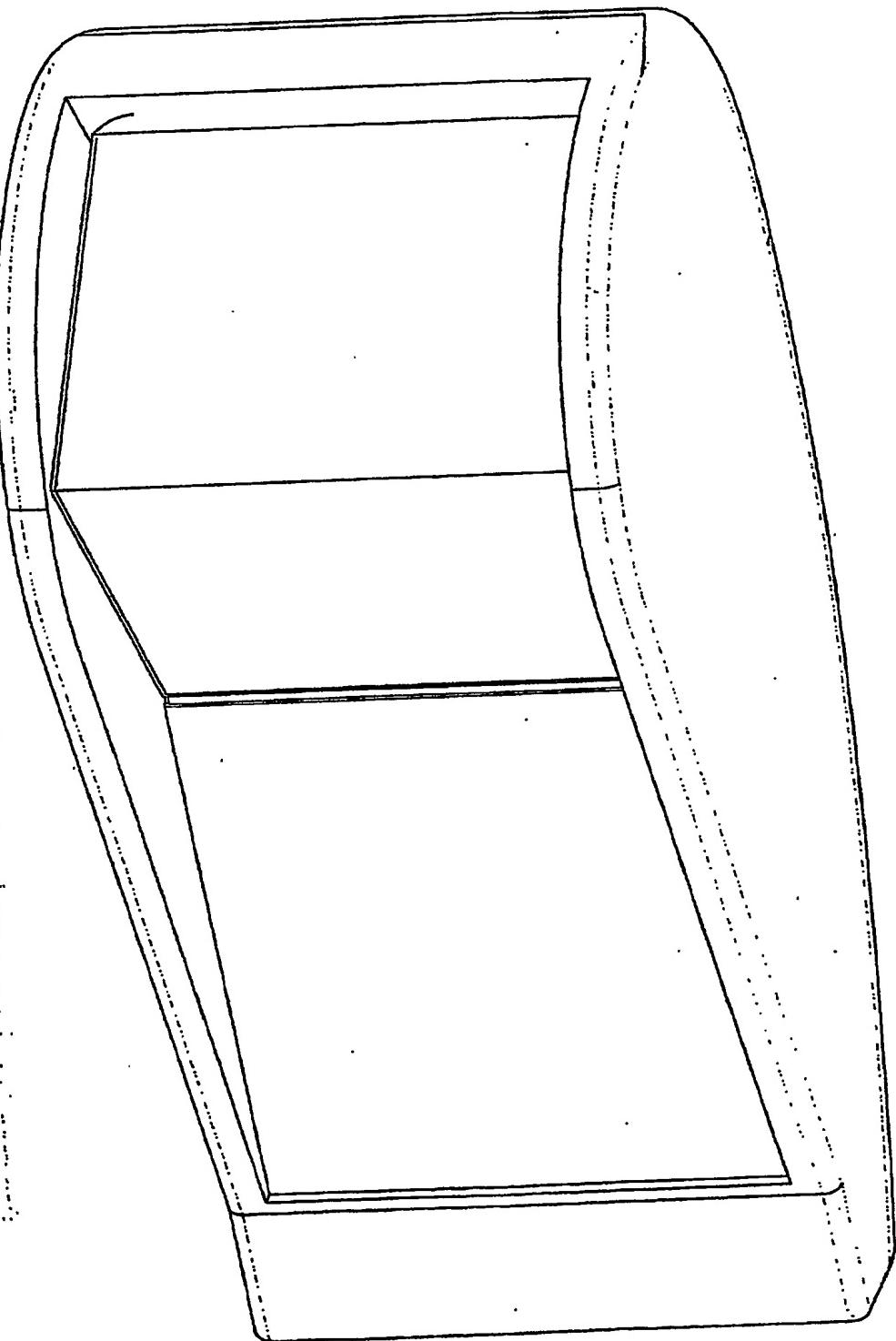


BLIND SPOT MIRROR.

consists of:

- transparent protective glass cover
- a flat mirror of 11 cm width [4.33 inches]
OR 3.15 inch x 3.15 inch
- a right angle prism 8 cm x 8 cm
- Internal refractive mechanism

Figure 17



consists of:
- transparent protective glass cover
- a flat mirror of 11 cm width (4.33 inches)
- a right angle prism 8 cm x 8 cm OR 3.15 inch X 3.15 inch
- internal refractive mechanism

Figure 18

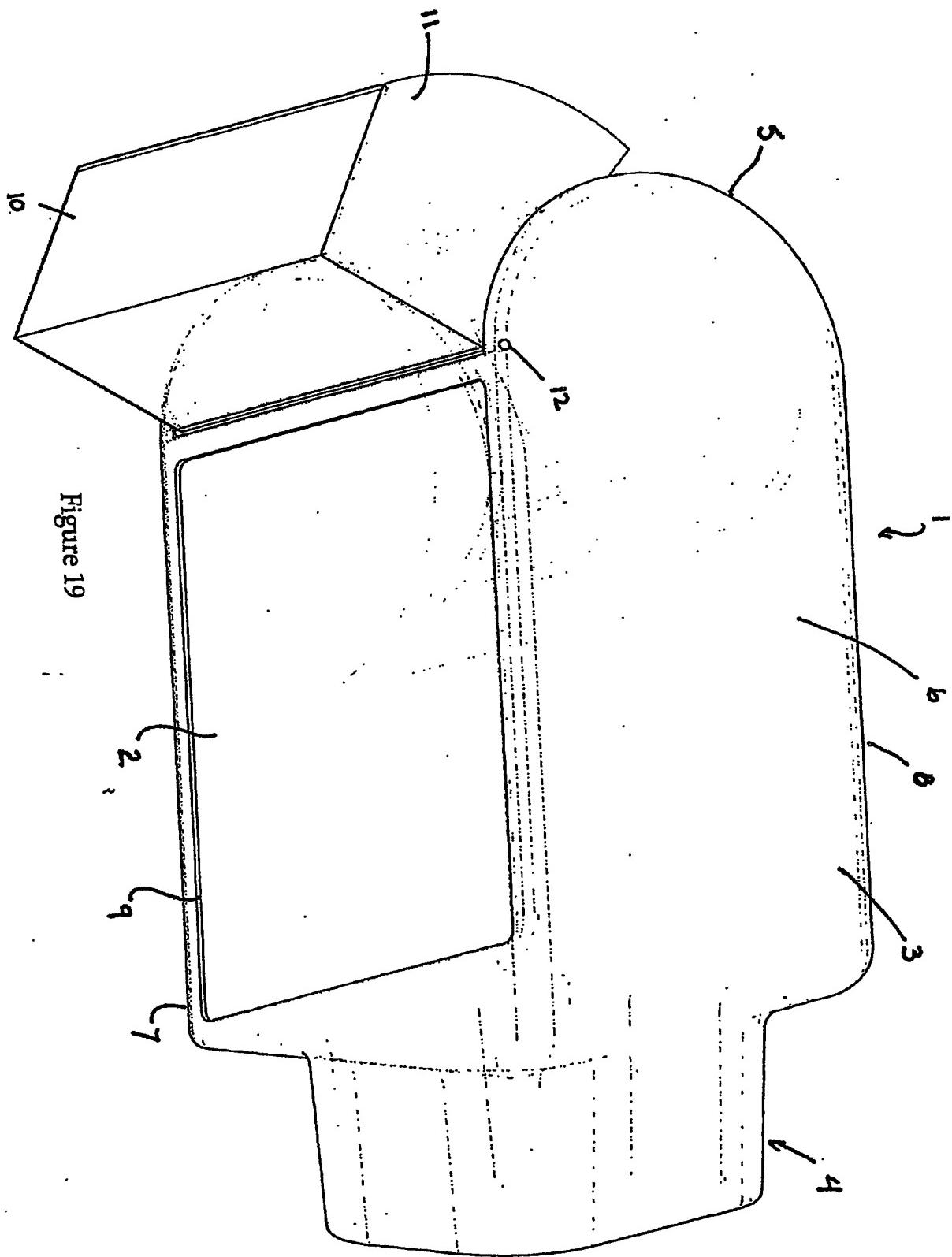
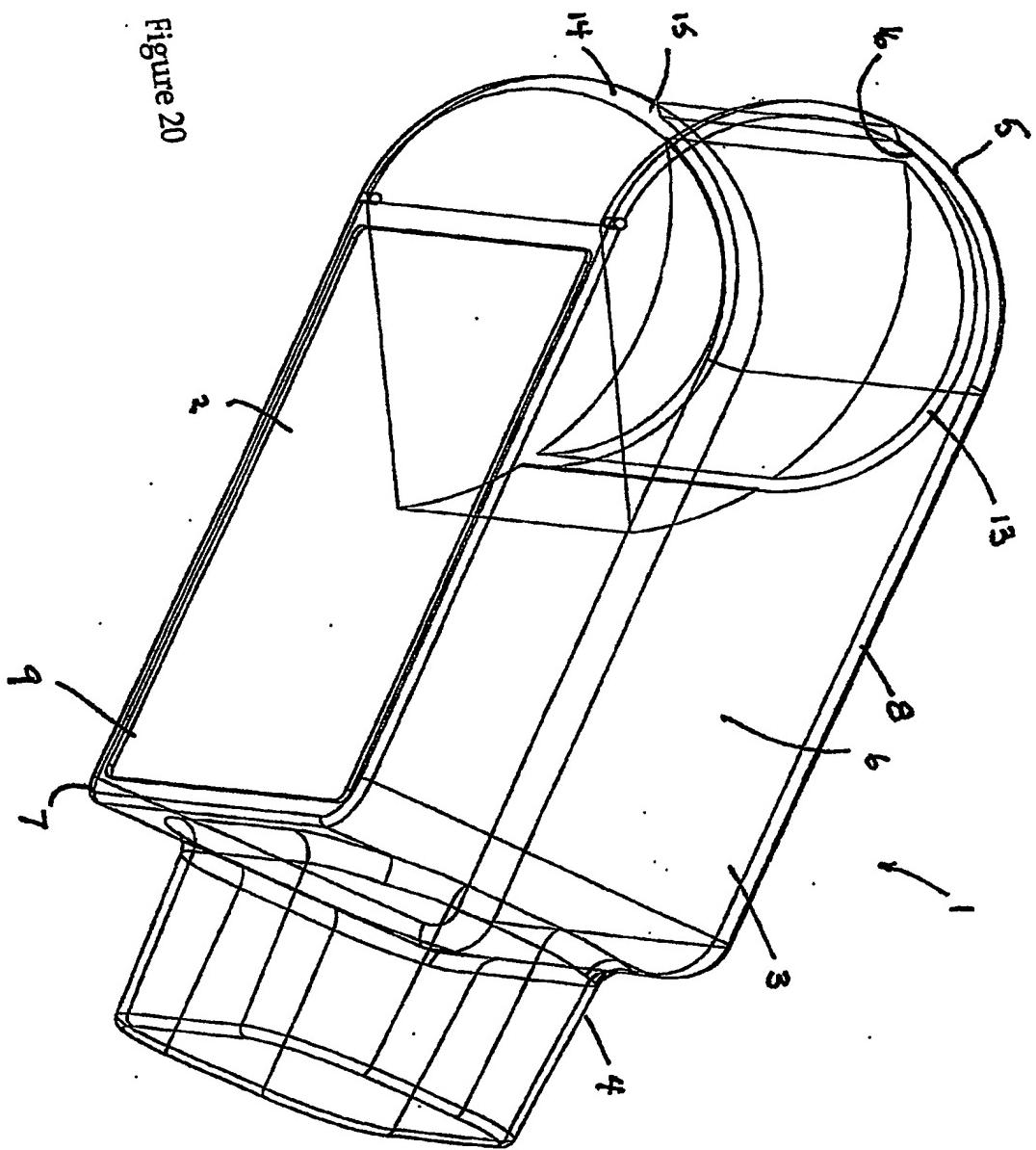


Figure 19

Figure 20



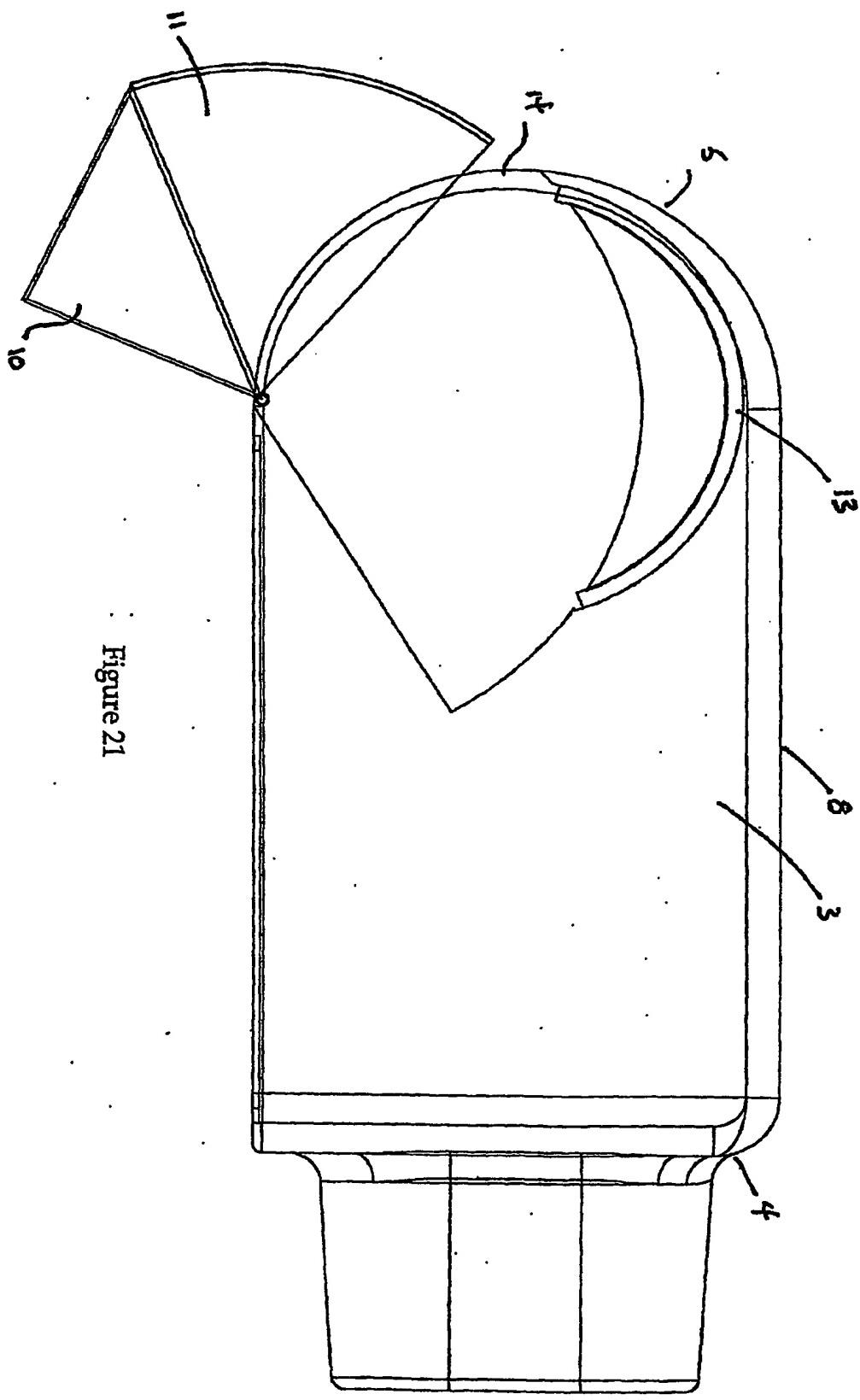
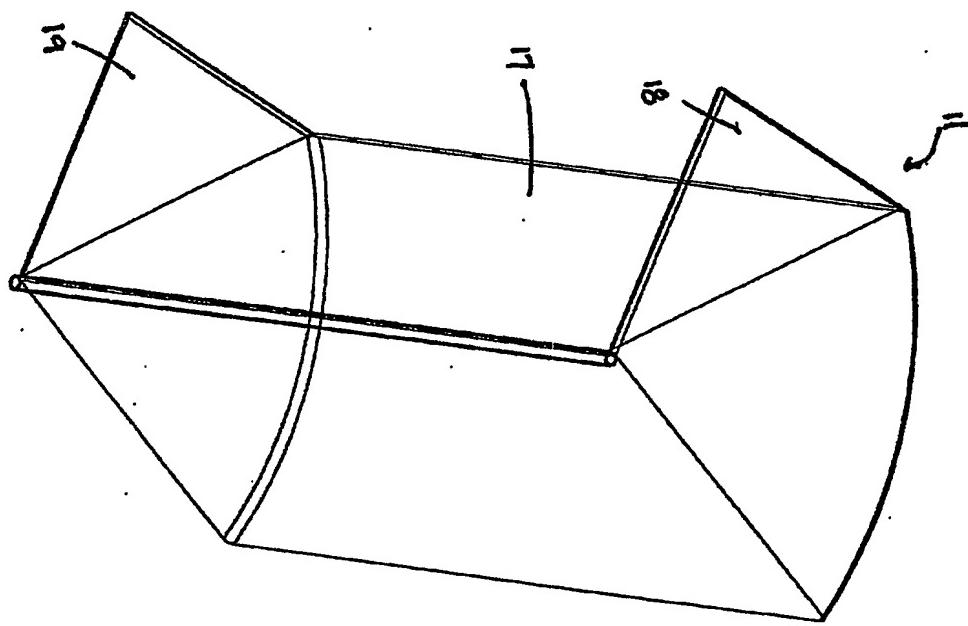


Figure 21

Figure 22



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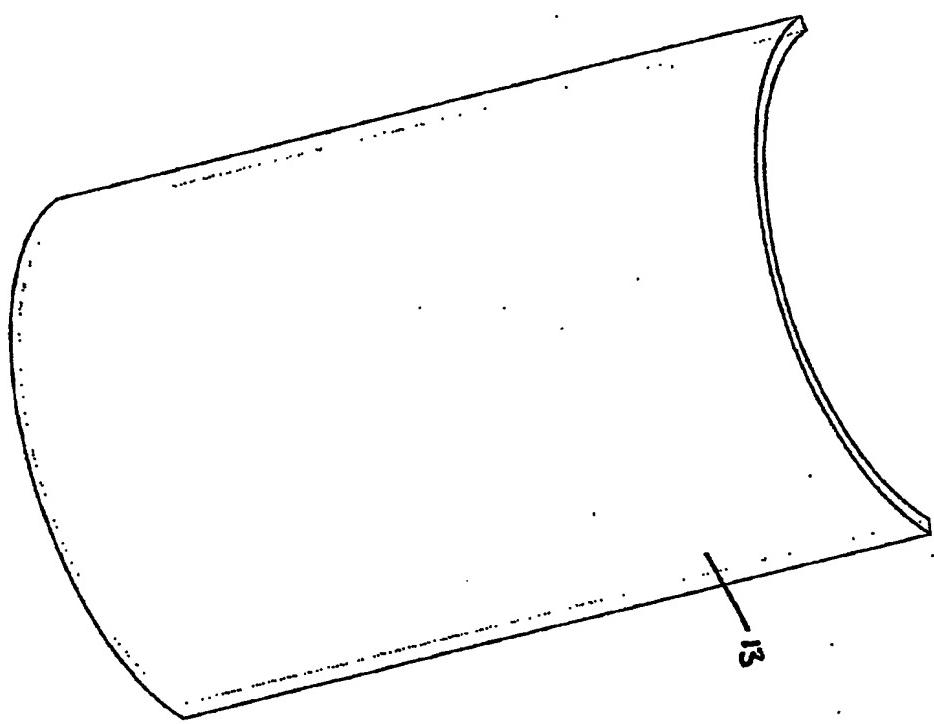
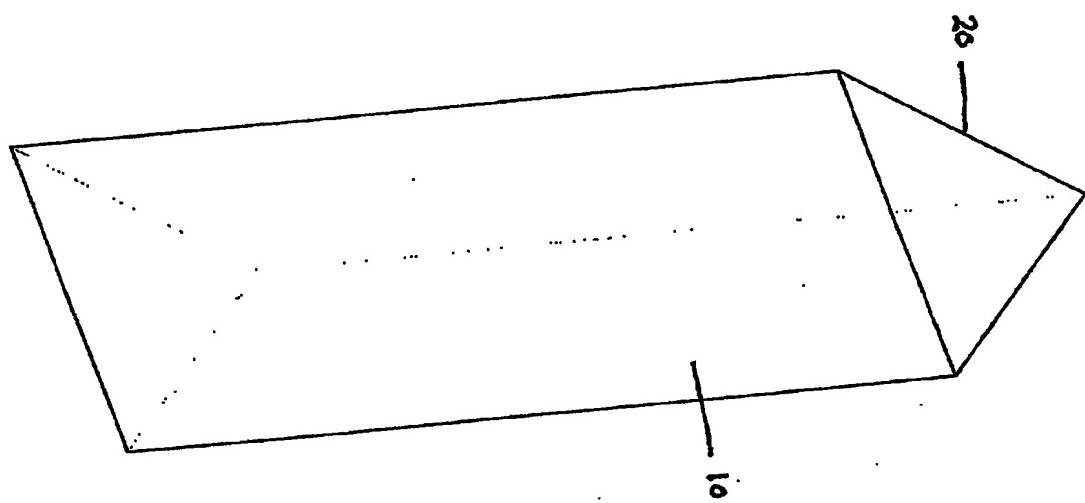


Figure 23

Figure 24



CROSS SECTION OF RETRACTABLE BLIND SPOT MIRROR,
ELECTRONIC METHOD OF OPERATION OF MIRROR,

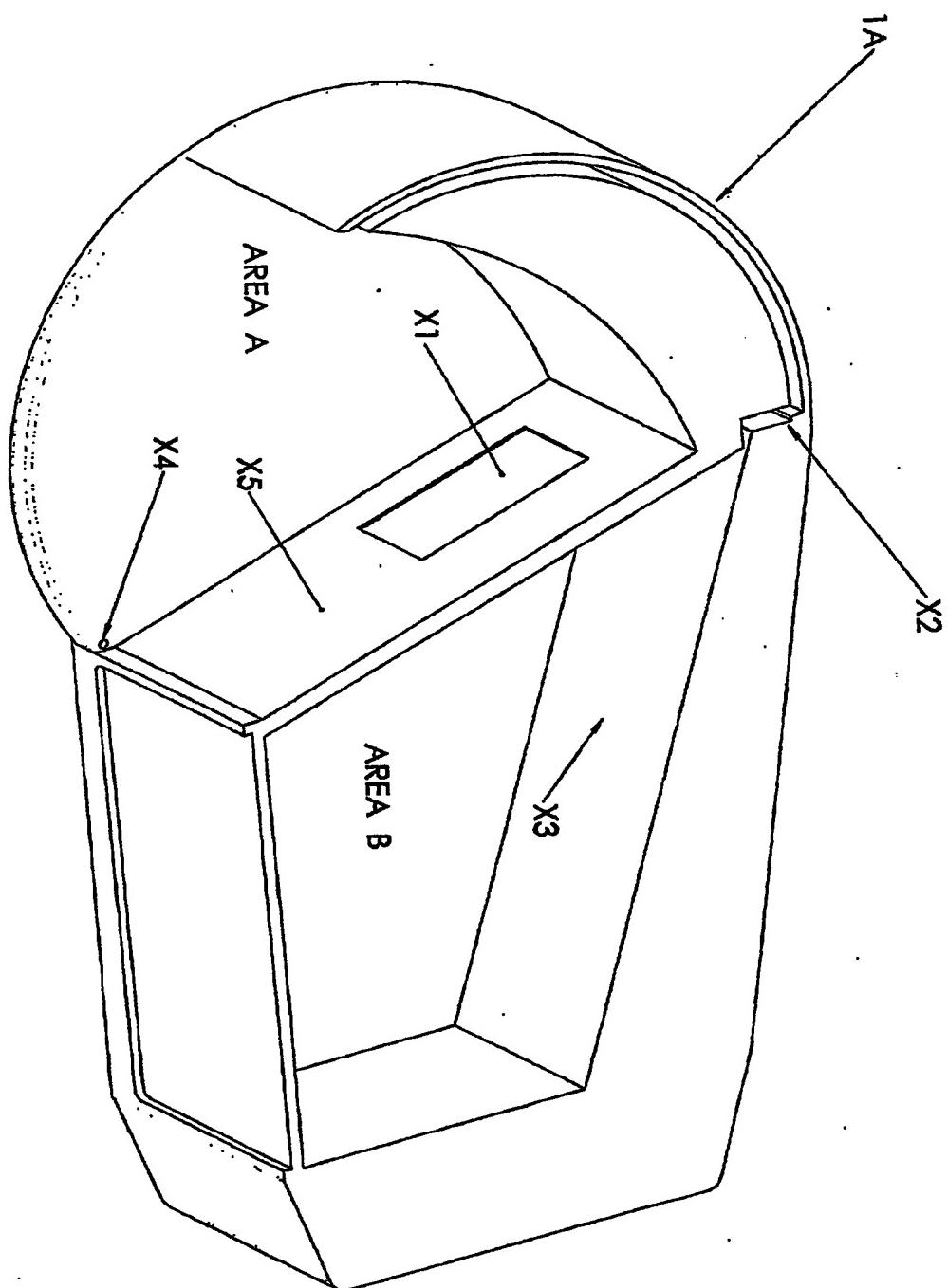


Figure 25

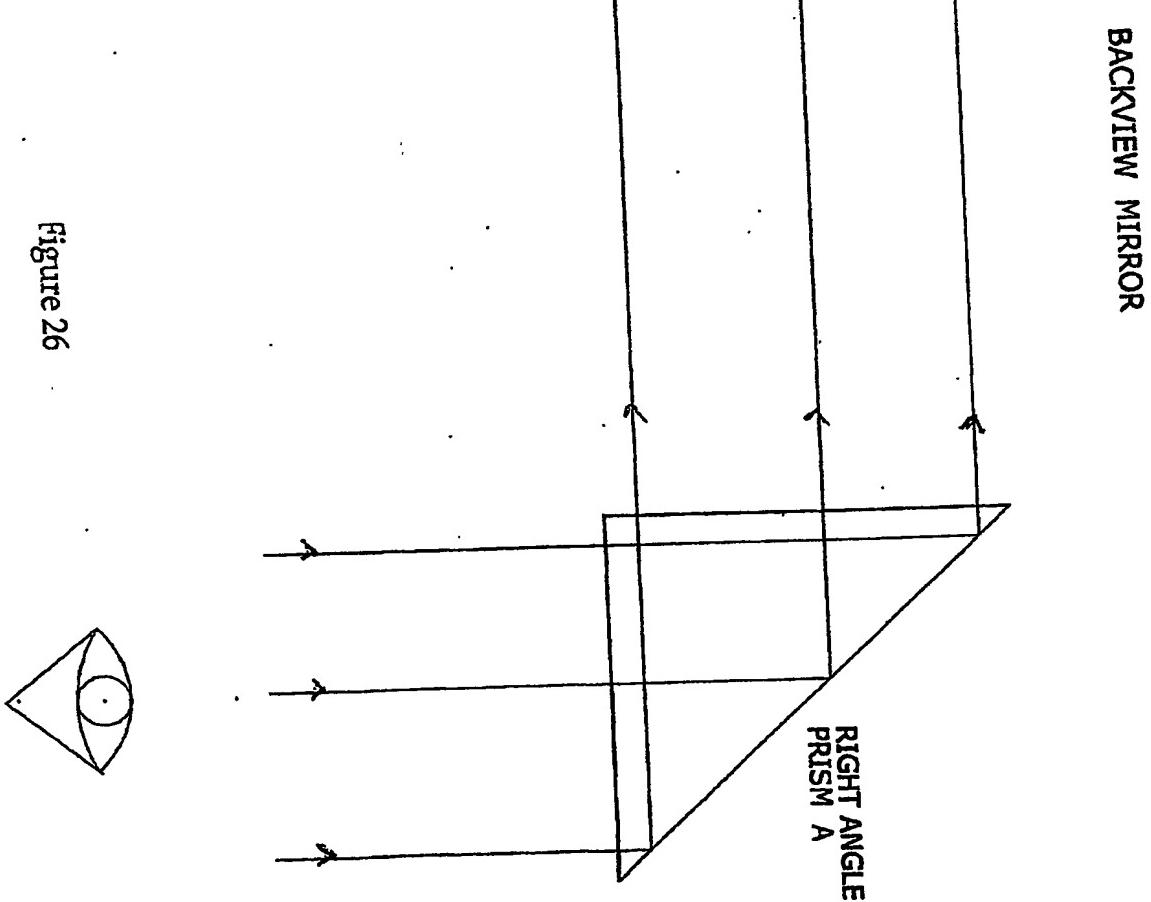


Figure 26

Driver is looking on to the RIGHT ANGLE PRISM A Ideally directly (perpendicular) and sees OBJECT Z thru PRISM B. Both right angle prisms are aligned as shown for maximum viewing angle.

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